The Glass Industry

Copyright, 1924, by Glass Industry Publishing Company, Inc., New York

Vol. 5 NOVEMBER, 1924 No. 11

Finishing Sixty Thousand Lamp Chimneys a Day

A Detailed Description of Factory Equipment and Operating Methods

By E. W. Koering

To speed up production and cut down cost of production is the aim of the manufacturer today. Keen competition and a growing demand for merchandise have been the main driving forces to bring this about. A visit to any five and ten-cent store will reveal an abundance of evidence of what has been done by the manufacturer in the matter of cutting down cost of production. The variety of articles that may be bought for five or ten cents each is almost beyond belief. Modern machinery and improved factory methods have accomplished this by greatly increased output at reduced cost, and gave rise to what is termed mass production.

Many articles of glassware, principally bottles, globes, and some classes of pressed ware have been made by continuous processes for some time and are now produced in enormous quantities. More recently paste mold or turn

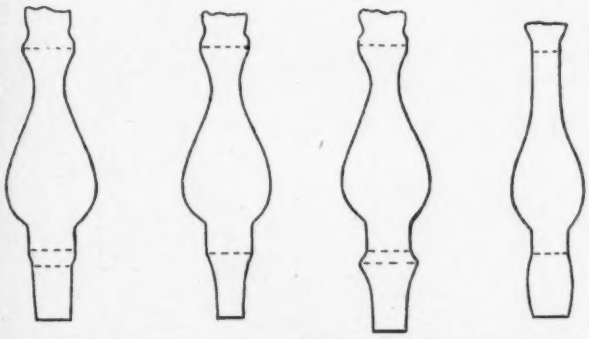


FIG. 1. A FEW OF THE VARIOUS TYPES OF WARE. Dotted line indicates where cuts are made.

mold ware has been made in large quantities on automatic or semi-automatic machines, and in this class fall thin blown tumblers and lamp chimneys. In spite of the extensive use of gas and electricity for lighting purposes in these modern times there is still a large demand for lamp chimneys in the rural and undeveloped districts of this country and in many foreign countries.

The following is a description of one process of manufacturing lamp chimneys with tumblers as a by-product.

The ware, comprising a chimney and tumbler combined in one piece is blown on semi-automatic paste mold blowing machines of the Owens type. This machine came out originally some eighteen or twenty years ago but a number of improvements have been added to it since that time, notably the taking-out mechanism. The personnel required to operate a machine consists of one feeder, three gatherers, a cracking-off boy and a carrying-in boy. This crew or shop, when working under favorable conditions can produce from 400 to 500 pieces of ware an hour. In this manner three shifts operating seven machines can turn out approximately 70,000 pieces in twenty-four hours. The ware is annealed in the usual manner in muffle lehrs operated on producer gas. As the ware emerges from the lehrs it is put into wooden trays of a size sufficient to comfortably hold forty-four No. 2 bulb chimneys. Ten of these trays, stacked five high on a low flat wooden truck with caster wheels, constitute a load. The ware made in eight hours by a shop operating one machine is designated a turn, the feeder being the foreman of the shop. From the lehr room the ware is taken by the load as needed, to the finishing department where the cutting and glazing is done.

The first operation is to cut the tumbler from the lower end of the chimney and the cullet from the upper end. The tumblers are given a preliminary inspection, the good ones put into trays holding 56, 72 or 100 depending on the size, while the bad ones are returned to the cullet bin via the cullet crusher through the medium of a system of conveyors. The chimneys, after being cracked off top and bottom on a cracking-off machine (Fig. 3) are placed in the glazing machine to be glazed on top and bottom, or crimped on top and glazed on bottom as the case may be.

The cutting off is all done by female help working in gangs or crews. One glazing machine takes the ware handled by four chimney cutters. An idea of the layout can be readily obtained by referring to the plan in Fig. 2. The four chimney cutters occupy positions indicated by the circles, two facing one another, on each side of the glazing machine and each supplied with a tray of ware to be cut.

FIG. 2. DIAGRAM OF LAYOUT AT RECEIVING END OF GLAZING MACHINE

The glazing machine being a bulky affair is built in sections and assembled in its permanent location. Fig. 2 shows a plan of the receiving end of the machine with the relative locations of the chimney and tumbler cutting machines as well as the positions of the operators, which are indicated by circles. The moving element of the glazing machines consists of two parallel link belts with cross bars between them spaced at regular intervals in the manner of a rope ladder with wooden rungs. This moving element slides in a track made of angle iron, the track being about forty feet in length and lubricated with oil and flake graphite. The driving power is supplied by a 2 H.P. motor through a set of reducing gears and a pair of sprocket wheels keyed to a shaft and spaced to mesh with the link belts of the moving element. A similar pair of sprocket wheels keyed to an idle shaft supported in sliding journal boxes at the opposite end of the machine provides means for giving the proper tension in the moving element. The cross bars (Fig. 4) made of cast iron are provided with two rotating cup shaped receptacles each of which holds a chimney in an upright position to be glazed. The cup or receptacle is really a toothed gear with the center hollowed out to fit the bowl of a chimney. Racks bolted to each of the two angle iron tracks engage with the teeth of the cups, rotating them as the moving element slides along. The cups, being bottomless, permit the heel of the chimney to project about an inch beyond the lower rim. The chimneys standing upright in the cups, rotate about a vertical axis as they are carried along, first above a set of glazing fires to glaze the bottoms or heels and then underneath a similar set of fires to glaze the tops, in the case of plain top ware. For crimped top ware the upper fires are run hotter and the chimneys heated sufficiently to allow them to be crimped as they emerge from under the fires. The crimping is done by hand as the chimneys pass along, without removing them from the cups.

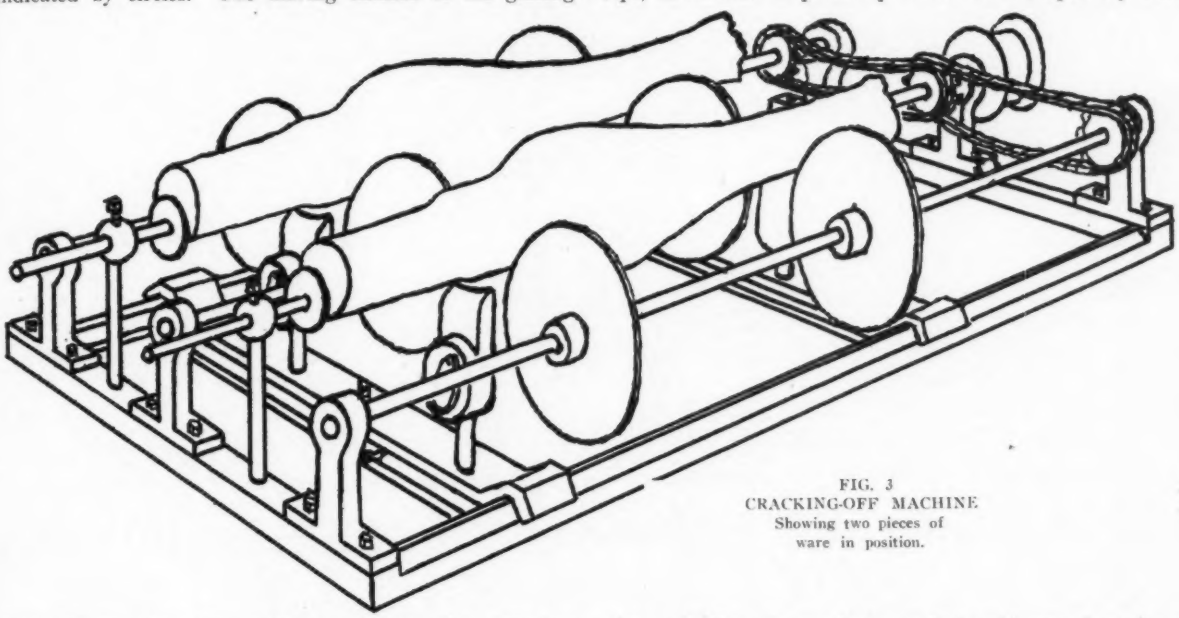


FIG. 3
CRACKING-OFF MACHINE
Showing two pieces of ware in position.

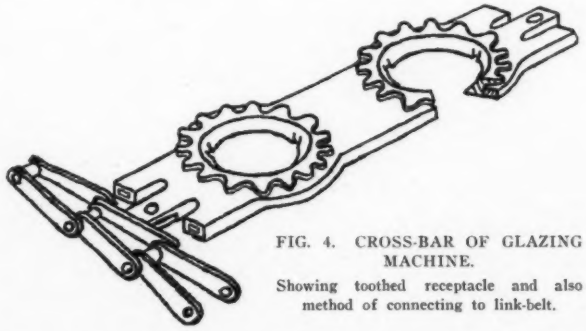


FIG. 4. CROSS-BAR OF GLAZING MACHINE.
Showing toothed receptacle and also method of connecting to link-belt.

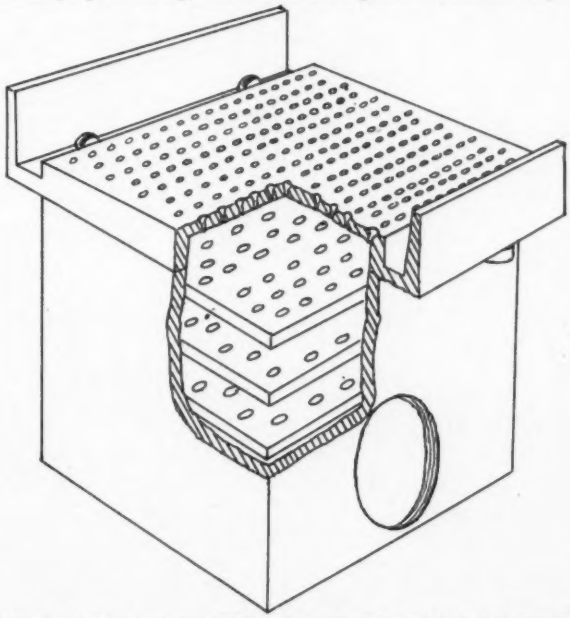


FIG. 5. ONE OF THE BURNERS OF WHICH GLAZING MACHINE IS CONSTRUCTED.

The cups are made to accommodate the largest sized ware to be glazed. When it is desired to glaze any of the smaller sized ware the cups are bushed with liners made to suit the size and shape of the ware in question. Each liner is

provided with two lugs corresponding to two grooves or slots in the cup so that when a liner is slipped into place it is only necessary to give it a quarter turn to hold it fast. A set of liners can be installed or removed while the machine is in motion and it requires about ten minutes to complete the operation. The speed of the glazing machine is adjusted to suit the kind of ware being glazed. The usual speed is such that thirty cross-bars will pass a given point in one minute. Since each cross-bar can carry two chimneys the machine will finish sixty chimneys per minute at that speed, if all the cups are filled.

The glazing burners are made of cast iron and the accompanying sketch (Fig. 5) gives an idea of the construction of one of the units. The purpose of the three cast iron screens shown inside is to aid in mixing the gas and air before burning. Natural gas or illuminating gas is used for fuel. At the discharge end of the glazing machine a transfer boy equipped with gloves and a pair of asbestos lined pincers in each hand removes the chimneys from the cups and sets them on a canvas belt conveyor which carries the ware to the selectors, wrappers and packers in the order mentioned. By the time the ware reaches the selectors it is cool enough to be handled with canvas gloves. At this point the chimneys are inspected and graded as to quality and finish. Ware may be rejected for stones, cords, striae, blisters, fire cracks, poor cutting, glazing or crimping, lehr melts, etc. The good ware is put back on the conveyor while that which is defective is put into trays to be later reclaimed by hand methods of refinishing or broken up for cullet as the case may be. After passing the selectors the conveyor carries the ware to another group of operators who put the chimneys into corrugated tubes, cardboard cartons, or wrap them in tissue paper according to requirements.

After passing through the hands of the wrappers the chimneys pass on to the packers where they are packed in lots of one or more dozens in corrugated paper boxes generally for domestic trade, or in wooden cases for export. At this point the ware is checked up as to quantity and placed on another conveyor that carries it to the warehouse to be put in stock.

By the employment of three glazing machines as herein described, due allowance being made for all necessary adjustments, no difficulty need be experienced in packing 60,000 lamp chimneys in a nine-hour day.

On Devitrification Phenomena in Practice in Glass Factory Operation*

By Hugo Knoblauch

The chapter of devitrification phenomena is doubtless one of the most difficult in the complicated fields of chemistry and physics of glass. The opinions concerning them are certainly very divided. Frequently phenomena such as changes that the glass undergoes under the effects of the constituents of the air are claimed to be devitrification as well as on the other hand we call certain transformations of the mass caused only by the temperature devitrification phenomena. In the first case it is therefore a case of pure chemical influences through which the glass is so changed in its composition that the constituents of it, the alkalies in this case, separate out from the substance "glass." There no longer remains pure glass here, on which account in this case the designation "decitrification" seems to be authorized apparently. On the contrary, in the second case transformations that the glass undergoes under the various effects of temperature without being changed chemically, for instance the turning opaque of the solidified opal glass mass is designated from the beginning as devitrification phenomena. Although no sharp difference can be made here because the different types of devitrification phenomena depend essentially on the chemical nature of the glasses. In the following considerations there will be described under "devitrifications" only those cases which can take place in the finished glass mass under the temporary effect of falling and rising temperature without an obvious chemical change occurring in the mass. As regards the theories and conformity to laws which have reference to the devitrification phenomena, we find valuable works in the literature of the last 20 years which need not be gone into more closely here.

These phenomena are encountered very frequently by the glass maker in practice, often in this or in that form. In general, however, he is neither inclined nor in a position to concern himself with the why and the because of these changes in the glass and to learn more about the extremely interesting modifications of these singular phenomena. It is just as hard sometimes for the research specialist himself to recognize with the different occurrences the devitrification phenomena clearly as such. With the aid of the illustrations given the author will endeavor from actual practice to describe for practical purposes some of the many structures possible under the influence of temperature in the glass mass.

In order to understand the character of the devitrification phenomena we must imagine that the glass mass, as such, transparent and brittle, acts somewhat like ordinary pitch in winter. If this is hit with a hammer, like glass it breaks into many splinters. Even at temperatures above the freezing point it still appears hard so that on dropping it breaks into pieces. If pitch is brought into a moderately warm room it goes over gradually to the soft condition; however, even at the boiling temperature of water it is not a thin liquid but remains viscous and can be pulled out in threads.

The glass fluxes act exactly like this only with the difference that the process of softening from the condition of maximum brittleness to the highest degree of thin liquid that can be pulled into threads takes place within the tem-

*Sprechsaal, Vol. 57. May 23, 1924. Translated for THE GLASS INDUSTRY.

peratures from 0° to 1,600°. During this softening we never, exactly as with pitch, notice a sudden transition from the solid to the liquid condition as in the melting of metals, but the mass becomes hotter and hotter, and thus very gradually becomes still softer without, even in the condition of greatest softness, becoming as liquid as the metals.

The glass owes this behavior to its chief constituent, silicic acid. Pure silicic acid, identical with pure quartz or quartz sand, when it is melted at a very high temperature acts exactly like the glass mass, while many of the other constituents melted, for example Glaubers' salt, even at about 900° already melt to a mobile water-thin liquid.

IN THIS ARTICLE the author discusses devitrification phenomena caused by temperature variations and illustrates devitrified structures produced in actual practice under the influence of temperature in the glass mass in the furnace.

For the proper recognition of the devitrification process it is important further to remember that two substances mixed together melt more easily, or what is the same thing are harder to solidify than when the difficultly fusible substance is melted all alone. Thus the solidification of water is retarded considerably by salt dissolved in it and mixtures of metals melt more or less below the melting point of the highest melting component according to the mixture ratio of the components.

In this regard the action of the alkalies on the silicic acid is to be valued. Although the exceedingly great viscosity of the pure silicic acid is not reduced very much as a matter of fact by the effect of the alkalies, for the glass melts are still very viscous, but considerably less so. Also, on the addition of lime to silicic acid what has been said on the lowering of the melting point holds completely, for the melting point of a silicic acid-lime mixture lies even below the melting point of the silicic acid which melts still more readily than lime.

The melting process of most materials, for example the metals and likewise certain salts such as soda goes on in the following manner: First the substance if heat is applied to it becomes constantly hotter, and actually the temperature of the substance being heated increases until its melting point is reached. However, fusion takes place so that at first its temperature does not change in spite of the continued heating, for the heat acting on the material is used in melting the substance. Only when the mass is completely molten is the molten liquid heated still higher by further introduction of heat until it attains the temperature that surrounds it, or it vaporizes in case its vaporization temperature is below that of the surrounding temperature.

The fusion process in the melting of the glass also goes on not exactly like this but similarly. After the mix is charged it becomes, at least in so far as it is exposed to the direct action of the heat, constantly hotter until it melts. As long as there are comparatively sufficient masses of the mix floating in the fused liquid, the temperature does not increase essentially but heat and fluidity increase only after the pot is filled or no more mix is introduced. However, as vaporization of the silicates formed as a result of thermolytic dissociation takes place only at temperatures which do not ordinarily prevail in the glass furnace, no considerable vaporization of the glass or its constituents takes place, but with constantly increasing the furnace heat a gradual overheating of the pots and the furnace construction materials begins of which the dreaded breaking of pots and destruction of the furnace by fire gives obvious testimony. With tank furnaces the danger of overheating is not present as long as new mix is added and finished glass is worked out, because even by the melting down of the mass, if this takes place in proportioned amounts heat is always being used.

However, if we reverse the process, which is done by the change of the material to the frozen condition, i. e., by cooling the mass, we can observe the following: The heated fused materials, metals or salts, if no more heat is introduced from without, become constantly cooler until solidification begins. At the solidification temperature reached, no further cooling takes place until the entire melt has solidified. Only after the complete solidification of the mass does a further cooling take place until the surrounding outer temperature is reached. In this solidification the smallest parts of the mass take a position according to very definite directions characteristic for the individual material; we call these positions crystal structure. In general such crystal formations are in the habit of growing uniformly if their melt is gently moved and sufficient time and quiet are available for the grouping of the crystals. The crystal form is, as it were, the natural form which all solid substances try to assume.

With the many materials which have already been known to us and the laws which they follow, there are a number of variations and irregularities so that it is only with difficulty that one succeeds in pointing out the different phenomena surrounding us. This, for example, we can observe that many liquid substances can be cooled rather far below their solidification point without solidifying, solidification takes place only when the mass is moved or a crystal of the same substance is introduced into it. We speak then of undercooled liquids. Especially do all known glass fluxes show this behavior in a certain sense, for we can see under the most ordinary conditions that the viscous mass cools without showing crystal segregations. The glass becomes, so to say, only gradually more viscous and a "solid liquid" or "solid solution."

However, we can cause the glass flux to crystallize when the cooling of the glass mass is retarded as much as possible. In this case the smallest particles of the liquid glass have the time to form into crystals at their solidification or melting point. With the great viscosity of glass more time is necessary for this than is available with the normal working

of glass, and for this reason the glass solidifies vitreously under the usual conditions. Therefore, we could designate the vitreous amorphous condition of the glass mass as abnormal, while the crystalline form would correspond to the original shape of the mass as it is also to be met with in

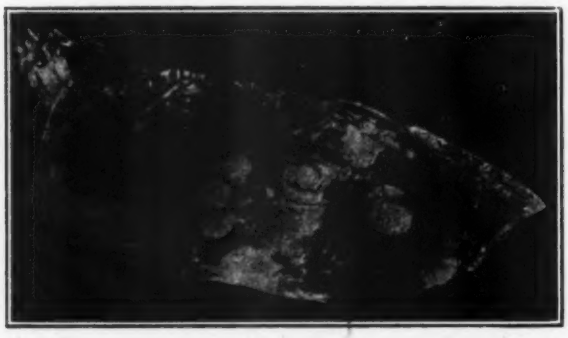


FIG. 1

the mineral kingdom in primitive rocks of almost the same composition. Actually also the tendency of the glass flux to assume the crystal form is evidenced everywhere; it is the problem of the glass maker to meet this tendency as far as possible and to keep the glass flux in its amorphous nature to such an extent that its properties, especially transparency will not be injured. After these theoretical discussions, however, different devitrification phenomena will be gone over for special observation. From the foregoing it results that the glass fluxes are inclined very easily to the separation of crystals if they are kept for a long time at a low tem-

FIG. 2

perature situated in the vicinity of their solidification point. This condition, however, never takes place on melting but very readily on working the glass. If the glass on working gets too cold in the furnace it ordinarily first becomes rough; it then shows numerous solid segregations which actually show crystalline structure under very strong magnification; in general, it gives the impression as if sand or insufficiently molten mix is distributed in the mass. By factory people this phenomena is also commonly regarded as badly melted glass, or one says without thinking about it: "The glass has run together."

Window and bottle glass tend toward such segregations especially readily on account of their high silicic acid and lime content; such mixtures melt with difficulty, but are cheaper and more resistant chemically than more easily melting mixtures. Therefore, it is not feasible to prevent these devitrification phenomena by making the glass richer in alkali, but it is of prime importance to see that the glass is not worked too cold, but is always kept hot enough. It is recommended to add alumina to the glass to retard separation of crystals; the method is good, but here doubtless one must remain within very moderate limits in order not to finally bring about other undesirable phenomena.

With continuous working temperature too low these segregations increase to such an extent that within one hour counted from the appearance of the first segregation the glass in the pots can be devitrified beyond recognition. In

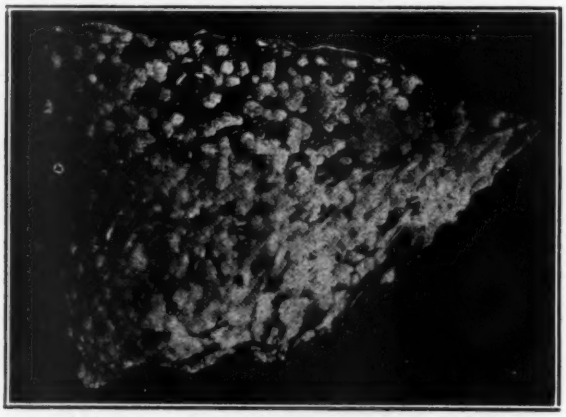


FIG. 3

this condition it can then no longer be rolled in the forms, nor taken up on the blowpipe, it no longer "picks up" and also can no longer be blown into thin-walled hollow articles.

In large tank furnaces, which have more heat stored in them devitrification during working as it is described here does not come about so quickly. It is due here to a number of hours at too low a temperature. However if it once starts, a longer stirring is also necessary in order to alleviate the condition.

The frequently heard opinion that a good glass should show no devitrification during working is not to be taken literally, for all of the sheet glasses and bottle glasses known to the author showed devitrifications on the decline of the working temperature; however, as definite as these crystallizations are on lowering the temperature, just as definitely they also disappear again without leaving a trace if the working out of the glass is stopped and it is stirred up later again; in sheet glass pot furnaces one hour suffices with safety.

It is well known that for purer working of the glass there are used rings in pots and boats (bridges) in tanks which float freely in the glass mass. The glass that is outside the boats and rings is generally slightly devitrified because the glass there remains quiet at a continuously lower temperature. If for example the rings in the glass pots are melted thin by long use the pots give much blowy glass, because then on taking the latter on the blowpipe the stiff glass is drawn out in the mass. The occurrence of blows therefore is not always, but mostly an indication of the beginning of

devitrification. The usual custom in many plants of returning to the pots immediately any unsuitable pieces from working on the blowpipe likewise considerably accelerates the devitrification.

It is characteristic that certain kinds of glass always crystallize in similar form.

Under conditions as they prevail on working the glass in the furnace, naturally one does not think of a marked characteristic formation of crystals but it is a case here always only of a tangled accumulation of crystal needles on the surface of the glass. In general these crystals form more easily on the latter than they would form within the mass under equal temperature conditions because from the exterior, due to the flame, for example, most tiny solid particles reach the glass whereby as already noted, crystallization is favored. Three or four hours time is always sufficient to permit the formation of well developed crystalline piles of

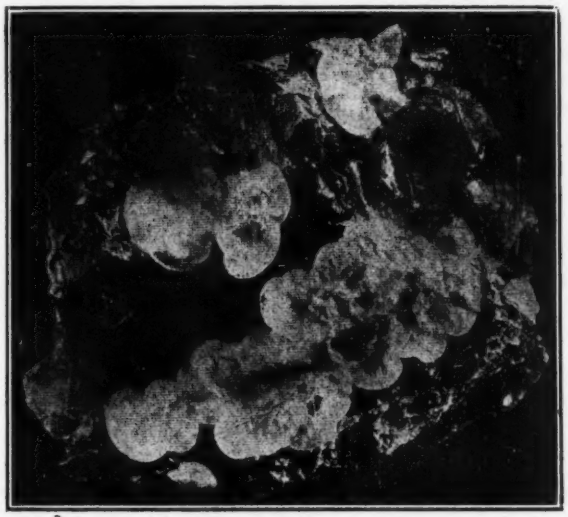


FIG. 4

considerable size and great uniformity at a suitable temperature in a normal window or bottle glass mass.

The writer has had the opportunity many times to observe the glass in full pots on rather long interruptions to operation and to determine that within a few hours crystal piles of hazel nut size grew in globules. Likewise a few hours were sufficient at a somewhat higher temperature to bring these globules back into solution. Unfortunately at that time there was no heat measuring apparatus available to determine the temperature region more exactly; it may be emphasized however, that only a moderate increase in heat which otherwise would not be sufficient for rapid melting, sufficed to dissolve the piles of crystals. Further, this process could be repeated at will. In Fig. 1 there is a piece of devitrified window glass which was melted from a soda mix in the pot. Window glass always tends to crystallize in this form if for example the pots in the melting furnace be cooled slowly.

An especially interesting crystallization of window glass, which was melted from a Glauber's salt mix in the pot and cooled in the full pot inside the melting furnace, is shown in Fig. 2. At relatively large and uniform intervals we find detached piles of crystal aggregates placed radially about the crystal nucleus. Deviating entirely from the size of these illustrations in the center of the piece we see a circular or spherical shaped group of crystals which attained a diameter of 40 m.m. On account of their spherical shape such forma-

FIG. 5

tions are called spherulites. Such uniform formations are rarely encountered in window glass for they are only possible under the most favorable conditions imaginable for the formation of crystals.

Figure 3 represents window glass that was formed in a tank furnace during repairs. The furnace was kept for some days under a fire that was not sufficient to work the glass. A part of the contents of the tank from which the sample was taken was drawn off, then the glass, suitably hot, was stirred and a further mix was melted on top. The glass could be melted again naturally without disadvantage.

Especially with these window glass crystallizations we can make a very interesting observation; it shows namely that all spherulites seem to stay in a bubble or be surrounded by a bubble so one might think the crystals had caused the gas bubbles. Naturally it is not so, the hollow spaces surrounding the spherulites are free from air. In the crystalli-

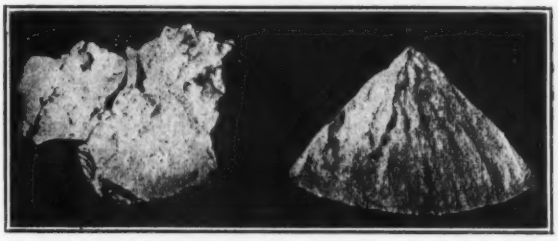


FIG. 6

zation of the glass a still denser arrangement of the molecules takes place, and the difference between the glass volume and the volume of the crystal is illustrated exactly by the size of the hollow spaces. In Fig. 2 we can even recognize in the picture the hollow space similar to a bubble, which encloses the largest formation of a spherulite.

On crystallization therefore, a decrease in volume or an increase in the specific gravity takes place. It is important to know this in practice as we often hear that devitrified glass sometimes rises from the bottom of the tank. If rough

glass appears for any cause at all in the tank furnace it is thought in many works that it comes up from below while from the explanation above it is shown that this can hardly be possible. If also in devitrified bottle glass cavities cannot be observed for a long time as plainly as in window glass or in white hollow glass it is already safe to assume that bottle glass is no exception.

Splendid spherulites form on slow cooling of window glass in the tank; here devitrifications are still more frequent than with sheet glass. If these spherulites are broken up they show the same radiating fibrous structure as in window glass, only with the difference that the color of the glass also finds expression in a dark green coloration of the crystals.

In older treatises we frequently find the opinion represented that with these devitrifications not so much the glass as such but only certain constituents of it separate out. From most pictures it can easily be concluded that this opinion is correct for we see between the heaps of crystals always relative large quantities of amorphous glass. Under the assumption that silicic acid and lime in the crystalline segregations have been able to separate out we would have to prove the residual glassy mother liquor considerably richer in alkali. However, as Fig. 5 shows green bottle glass direct from the bottom of a tank furnace, bottle glass can devitrify completely up to the last bit. From this it results that the spherulites are completely like the formations in Fig. 4. From the mass crystallized through and through we can still plainly recognize the individual spherulites and see how the innumerable tiny crystals radiate from some crystal centers.

Brown bottle glass in a devitrified condition is shown in Fig. 6. It is characteristic that in brown bottle glass very large isolated spherulites together with many small ones seem to form easily. The right half of Fig. 6 shows a fragment of such a spherulite whose diameter was about 70 mm. and in which the structure can be seen plainly.

It is important for the different occurrences of devitrification phenomena, whether a glass goes from the hot to the cold condition slowly or the reverse, whether it is fluctuating now hot now cold and within the temperature interval in which devitrifications are generally expected.

Thus for example it is safe to assume in samples 1, 2, 4, 5, 6 that they have gone over gradually from the hot to the cold condition, while in sample 3 it is certain that the glass has been alternately now hot and now colder within the heat range necessary for devitrification.

(To be continued)

An American Ceramic Institute*

By Robert D. Landrum
President of the American Ceramic Society

Since last May, when the idea of the Ceramic Institute was first presented on this page, much advancement has been made. However, the Ceramic Institute as it stands today is still only an idea, an idea entirely different from what it was a month ago, and quite different from what it was several months ago. Very probably it will be very different from what it is now, after we discuss the matter at the Columbus meeting next February. Any detailed propositions which have been made have been given so that we can discuss the matter. The Ceramic Institute idea is to find some method of organization so that a real research program can be financed and carried out without duplication.

Every function of this Society of ours revolves around one fundamental purpose: to bring into one organization all the men who are striving to improve the products of the silicate industries, and to provide for them the advantage of benefiting by the experiences of their fellow workers through personal discussion at our meetings, and through the formal papers given in our publication. At first a very simple organization was satisfactory. At the Section Q meetings, practically the whole membership could sit at one table, but as the scope of our activities expanded, division into groups was necessary, and we have today the advantage of seven technical societies represented by our Divisions, held together in one well-knit organization, with the committees so interwoven that there is no duplication of activities. Our organization is successful, for we have, at a very small expense, so guided our activities that the results are astounding.

No country in the world can boast of accomplishments such as ours in the ceramic field, and, without doubt, it is due to our organization in this Society. We are at the point now, though, where it is very necessary that some arrangement be made whereby research in our industries can be initiated according to a definite program. Up to this time, the research which has been done has been initiated by our individual members, and for the most part, has been merely reported at our meetings and in our publications. The American Ceramic Society is the organization which can most quickly bring into being a Ceramic Institute today to do this very thing.

Although the interests of all the silicate industries are very closely allied, and a great deal of the research which should be done is fundamental to each and every one of the industries represented, still a large portion of the problems fall very naturally into groups which are represented by our different Divisions. Therefore, I feel that the Ceramic Institute should be a federation of several specific Institutes.

The Clay Products Institute is already being organized, and care should be taken that this does not become so complex that individual initiative is hampered. There should also be formed a Glass Institute, a Terra Cotta Institute, a White Wares Institute, and an Enamel Institute, each of these centralized in the Ceramic Institute. The organization of these specific divisions can be initiated by the trade associations of the industries represented, or by the Divisions

*Jl. Amer. Cer. Soc., Vol. 7, No. 10 (Oct., 1924).

of our own Society in collaboration with these trade associations.

In any plan that can be evolved, there must be a research head, a salaried man to coördinate all of this work and to see that the fundamental work which is useful to each and every separate Institute is done and not duplicated. This man should be definitely connected with our Society. Such a man would be in the position to determine just what part of the work could be done in the individual plants interested. He would determine what work could be done in laboratories such as can be found in the various schools. This would mean the establishing of more Fellowships. He would know the facilities of the various Government laboratories, and determine what part of the work could be done in these. He would lead in the formulation of a research program and see that this was carried out. He would be the research director of each of the separate Institutes, and head the committee on research in our Society.

The American Ceramic Society has a big job ahead of it in guiding this tremendous idea. Research as we know, does cost money, but we know, too, that research properly guided probably yields the largest returns that can be obtained from money invested in any way. Real research is expensive. Care must be taken that there is no duplication.

In any event, the most economical plan will be for the American Ceramic Society's general offices to take care of all of the organization work. The general meetings would be one and the same. The Ceramic Institute itself should be very closely connected with our Society, but each of the component Institutes should be separate from the Society and self-determining.

Each of us, and especially those in charge of the divisional work, should give this matter their most careful thought, and at the Columbus meeting, definite plans should be made to initiate the organization of each of the separate Institutes. We have the opportunity here to initiate a co-operative plan such as has never been dreamed of in any field, and one which will bring actual results to the silicate industry. I hope that each one who reads this and is interested, will give this matter immediate and careful consideration and try to formulate some definite plan, so that when we get together in Columbus, we can make a real start. This plan must be built on a secure foundation, and we need the best from every worker in our Society.

Preliminary Report on the Glass Industry for 1923

Preliminary statistics giving the results of the biennial census of the glass manufacturing industry for the year 1923 were released by the Department of Commerce on October 16.

Of the 332 establishments reporting for 1923, 85 were located in Pennsylvania, 76 in West Virginia, 33 in Ohio, 29 in Indiana, 17 in New York, 15 in Oklahoma, 14 in New Jersey, 13 in California, and 12 in Illinois, and the remaining 38 were distributed throughout 14 states.

The total value of all glass and glass products produced in 1923 was $308,828,914, an increase of 44.7 per cent over the total value of the 1921 production. Large increases in production were made in all branches of the industry. There was an increase over 1921 of 96.2 per cent in the number of square feet of window glass produced and the total value of this glass was 77.4 per cent greater than that of the 1921 production. Production of obscured glass, including cathedral and skylight, increased 121.9 per cent over 1921, the increase in the total value being 100.8 per cent. Sixty-eight per cent more polished plate glass was produced in 1923, the total value being 74.9 per cent higher than in 1921. A prodigious gain was made in the percentage of increase in the production of rough plate glass, made for sale as such, the increase amounting to 556.1 per cent and the total value being 753.6 per cent over 1921. A 26.9 per cent increase in the square feet of polished wire glass products was made. The production of rough wire glass, made for sale as such, increased 106.5.

The cost of materials, including fuel and containers, increased in 1923 by 31.5 per cent. The amount of coal consumed in 1923 was 3,121,576 tons of 2,000 pounds. In 1921 this item was not reported and therefore no comparison can be made. Primary power was used in 1923 to the amount of 240,528 horsepower.

An interesting comparison of the average value per unit (square foot) of building glass in its several forms in 1923 and 1921, as derived from the census figures just issued shows that window, obscured and rough wire glass had a lower average value per square foot in 1923 than in 1921, while polished and rough plate, and polished wire glass in 1923 had an increased average value per square foot, as follows:

Window glass: 1923, 8.35 cents; 1921, 9.24 cents per square foot.

Obscured glass, including cathedral and skylight: 1923, 11 cents; 1921, 12.1 cents per square foot.

Polished plate glass: 1923, 68.8 cents; 1921, 66.2 cents.

Rough plate glass: 1923, 19.6 cents; 1921, 15 cents.

Polished wire glass: 1923, 58.8 cents; 1921, 54.6 cents.

Rough wire glass: 1923, 13.4 cents; 1921, 15.1 cents.

Summary

	1923	1921	Per Cent of Increase
Number of establishments	332	329	0.9
Wage earners (average number) *a*	73,334	54,748	33.9
Maximum month	Apr. 77,049	Dec. 66,673	....
Minimum month	July 68,422	July 42,016	....
Per cent of maximum	88.8	63.0	....
Wages	$89,897,948	$68,224,248	31.8
Cost of materials (including fuel and containers)	$113,170,262	$86,036,406	31.5
Products, total value	$308,828,914	$213,471,309	44.7
Building glass, value	$121,235,241	$68,951,418	75.8
Window glass—			
Square feet	510,214,838	260,065,080	96.2
Value	$42,623,203	$24,026,366	77.4
Obscured glass, including cathedral and syklight—			
Square feet	46,376,243	20,901,698	121.9
Value	$5,113,932	$2,546,949	100.8
Plate glass, total cast, square feet	124,780,223	79,965,703	56.0
Polished—			
Square feet	94,469,718	56,238,783	68.0
Value	$65,165,675	$37,260,559	74.9
Rough, made for sale as such—			
Square feet	4,669,802	711,744	556.1
Value	$914,298	$107,107	753.6
Wire glass—			
Polished—			
Square feet	2,804,661	2,210,602	26.9
Value	$1,651,595	$1,208,592	36.7
Rough, made for sale as such—			
Square feet	28,801,764	13,948,837	106.5
Value	$3,881,538	$2,107,695	84.2
All other building glass, value	$1,885,000	$1,694,150	11.3
Pressed and blown glass *b*—			
Value	$77,279,007	$55,718,148	38.7
Bottles, jars, etc.*c*—			
Value	$107,230,589	$85,743,414	25.1
All other products *d*—			
Value	$3,084,077	$3,058,329	0.8
Value added by manufacture *e*	$195,658,652	$127,434,903	53.5
Primary horsepower	240,528	(*f*)	....
Coal consumed (tons of 2,000 lbs.)	3,121,576	(*f*)	....

a Not including salaried employes and proprietors and firm members. Statistics for these classes will be given in final report.

b Including jelly glasses, tumblers and goblets, but not including bottles, jars, etc.

c Including demijohns and carboys.

d Paper and wood boxes, packages, windows, millwork, sheet-metal goods, glass cullet (broken or refuse glass for remelting), and other miscellaneous items.

e Value of products less cost of materials.

f Not reported.

The Glass Industry

The First Technical Trade Journal Devoted Primarily to Glass Technology, Engineering, Raw Materials, and Glass Factory Equipment and Operation.

Published Monthly by the
GLASS INDUSTRY PUBLISHING COMPANY, INC.
50 Church Street, NEW YORK

Telephones { Cortlandt 2465 / Cortlandt 5618 — Cable Address, Glasdustry

J. B. KRAK, Technical Editor

Subscription Price.....$2.00 a Year
Single Copy.....20 Cents

THE GLASS INDUSTRY circulates extensively among American and foreign glass manufacturers, their business executives and technical and factory operating staffs.

ADVERTISING RATES SENT ON REQUEST

Vol. 5 NEW YORK, NOVEMBER, 1924 No. 11

CONTENTS

	Page
Finishing Sixty Thousand Lamp Chimneys a Day	203
On Devitrification Phenomena in Practice in Glass Factory Operation	206
An American Ceramic Institute	210
Preliminary Census Report of the Glass Industry for 1923	211
Editorial:	
The Proposed Ceramic Institute	212
Technical Consultation Service:	
Decolorizing Cullet for Making Bottles	213
Industrial Publications	213
Recent Patents	214
Fall Meeting of Glass Container Association	216
The Glass World and What It Is Doing:	
American Window Glass Annual Report	218
Glass Company Sued	219
Decision in Bulb Machine Patent Case	219
Cheap Gas at Corpus Christi, Texas	219
Reducing Building Costs	219
Mirror Manufacturers Establish Fellowship	219
Trade Activities	220
Coming Meetings	221
Inquiries Received	221
What the World Wants	221
Stock Quotations	221
Current Prices of Glass-Making Materials	222
Monthly Summary of U. S. Foreign Commerce in Glass	232

CLASSIFIED BUYERS' GUIDE, PAGE 18
INDEX TO ADVERTISEMENTS, PAGE 20

Readers of THE GLASS INDUSTRY in the United States and elsewhere are requested to favor the Editor with any information available from time to time concerning developments in their own or other fields which would be of general interest to the industry. Authoritative facts about new glass manufacturing projects, re-organizations, new factory construction, new processes and equipment, raw materials, manufacturing and market conditions, personal items, and other appropriate subjects would be welcomed.

Those experienced in the practical, technical or executive activities of glass manufacturing who are qualified and willing to lend their aid to the upbuilding and progress of the industry by giving from their store of knowledge to others, are invited to submit for publication articles on any subjects relating to glass which would be of interest and value to our readers. The authors of accepted articles of this kind will be compensated at usual rates.

The Proposed Ceramic Institute

Last May the American Ceramic Society proposed the organization of a Ceramic Institute which—to quote from the Secretary's letter—"would be in every respect and more the National Research Council for the ceramic industries, conducted by ceramists. It would be carrying to fruition the aims and purposes which the National Research Council has for industries generally."

It was proposed that the American Ceramic Society be employed for this purpose, in fact that the society be merged into the new organization.

At the time the formation of the Ceramic Institute was advocated it was realized that while the idea of such an organization deserved serious consideration on the part of glass makers, the proposals were as yet too vaguely outlined to permit any comments.

The classification of the glass industry as one of the ceramic industries is somewhat artificial. The meaning of the word "ceramic" has to be stretched considerably to include glass manufacturing. Fundamentally glass making and the manufacture of clay products have little in common. The grouping of the glass industry with the ceramic industries has not always been to the advantage of the former. In publications devoted to ceramics, glass making usually receives only comparatively slight consideration. Glass manufacturers as a rule are not interested in clay products with the exception of refractories. It is only a few years since a Glass Division was organized as a distinct section of the American Ceramic Society. It is therefore not strange that there was some apprehension on the part of glass manufacturers with whom the matter was discussed that in the formation of the Ceramic Institute the glass industry would not fare as well as its importance warrants.

This journal from the day of its first issue has consistently advocated the application of modern scientific methods to the solution of technical problems. On every occasion it has urged the formation of an American glass research association. That the glass makers of this country could support such an organization with great benefit to themselves has been pointed out in these columns. The work of the British Glass Research Association, the Society of Glass Technology and of the Deutsche Glastechnische Gesellschaft organized a few years ago is sufficient proof of the feasibility of such a plan.

That the project as set forth by the Secretary was only tentative and that the right mode of organization would be evolved once the matter had been put up for discussion was evident. It is gratifying to note that further consideration has led the President of the American Ceramic Society to publish in the October issue of the *Journal*[1] a plan to the effect that the Ceramic Institute become a federation of several specific institutes. The Clay Products Institute is already being organized. The formation of a Glass Institute, a Terra Cotta Institute, a White Ware Institute and an Enamel Institute is proposed, each of these to be centralized in the Ceramic Institute.

THE GLASS INDUSTRY feels that it can heartily endorse the proposal of President Landrum in its present form provided

[1] Reprinted on page 210, this issue, this journal.

that each of the component institutes will be independent and can themselves determine what kind of research work is needed. As we view the matter, the creation of the office of a Director of Research would be a grave mistake. There is no one man who is capable of taking upon himself the work of directing the research work of all of the institutes. This should be left entirely to the directors of the various institutes. A committee of the directors can see to it that there shall be no duplication of investigational work.

At the Columbus meeting next February definite plans are to be made to initiate the organization of the different institutes. The plan of President Landrum certainly deserves the most earnest consideration of all glass maunfacturers. With proper interest and co-operation the formation of a glass research organization, so much needed by the industry, may be secured through the splendid initiative of the American Ceramic Society.

Technical Consultation Service

Question 62. (From England)—Decolorizing Cullet for Making Bottles. We are making bottles from all cullet, using an open fired tank. The bottles are pale green in color. We are desirous of making it a white metal and would like your advice as to a decolorizer which will mix with the cullet and not sink in patches when added, as manganese does. Also can you give us a batch which will produce a white metal?

Answer.—It is difficult to make white glass from pale green cullet. If the use of manganese is not desired, selenium may be substituted. It has been used with success in this country, but it requires an expert to ascertain just how much is required for the kind of cullet used. The cullet should be in a powdered condition and intimately mixed with a small amount of selenium. It would be necessary to make a number of experimental melts in small pots to find the amount of selenium needed. It should be remembered that perfectly white glass which is entirely satisfactory when put in the lehrs sometimes comes out a faint pink. This indicates that too much selenium has been used.

It would appear that the use of white cullet would save you the trouble of using a decolorizer, however, this may not be feasible. Only a slight color can be compensated for. If the green color is too deep, no amount of decolorizer will produce a white glass.

The following batches will give a white metal provided the materials used are pure and low in iron:

Sand	100	kilograms
Soda ash	30	"
Potash	4	"
Burnt lime	15	"
Nickel oxide	6	grams
Sand	100	kilograms
Soda ash	30	"
Burnt lime	15	"
Saltpeter	4	"
Nickel oxide	7	grams
Sand	100	kilograms
Soda ash	34	"
Marble	16	"
Nickel oxide	6	grams
Sand	100	kilograms
Soda ash	33	"
Limestone	20	"
Saltpeter	2	"
Oxide of antimony	150	grams
Arsenic	150	"

—J. B. K.

Industrial Publications

"Red Devil" Glaziers' Tools, a new booklet issued by Smith & Hemenway Co., Inc., 261 Broadway, New York, illustrates and describes their extensive line of glass cutters, circle cutters, cutters' wheels, glass nippers, strippers, putty knives, stripper handles, gauges, cutting boards and breakers, combination oval and circle cutters, and others.

Ramsden's Monthly Bulletin for the Glass Industry. A leaflet issued monthly by C. E. Ramsden & Company, Fenton, Stoke-on-Trent, England, manufacturers of colors and chemicals for glass, pottery and enameling. Dr. C. J. Peddle is consulting chemist for this company and presumably is responsible for the interesting discussions of glass making materials, one of which appears in each issue of the leaflets. Some of the subjects covered in recent issues are zinc oxide, barium compounds, opacifying materials, etc.

One Hundred Years of British Glass Making. 1824-1924. A booklet issued by Chance Brothers & Co., Ltd., manufacturers of window glass, and lighthouse engineers and constructors, with factories at Smethwick, near Birmingham and Glasgow, in commemoration of a century of glass making by the firm. A history of the business is given and the outstanding achievements of the company cited.

Price List No. 56, September, 1924, of the products of Wengers, Ltd., Etruria, Stoke-on-Trent, England, manufacturers of chemicals, colors, and materials for the pottery, glazed brick, glass and metal enameling industries. A 100-page catalog and price list containing thousands of items manufactured or sold by this concern. Included in the list are raw materials for the ceramic trades, some of the items being china clay, feldspar, fluorspar, metallic oxides, glazes, enamel colors, liquid gold and lustres, colors and oxides for glass.

Modern Glass Machinery. Catalog 4-A issued by Hansen, Sommer & Maca, Inc., 671 West 16th street, Chicago, Ill. A 48-page catalog of the company's beveling and polishing machinery, roughing and emery mills, polishing machines, edge grinders and polishers, combination polishing and grinding machines, abrasive mixers and feeders, glass drilling machines, glass cutting lathes, automatic glass surface polishing machines, silvering tables, gas and electrically heated water stills, boilers, glass cutting specialties, abrasives and numerous other items used in beveling and mirror shops.

Laclede-Christy Film Story.—"The Story of Fire Clay Refractories" is the title of a four-reel film produced at the plant of the Laclede-Christy Clay Products Company, St. Louis, Mo., under the direction of the Bureau of Mines, United States Department of the Interior. The film shows the process of making refractories from mining the clay to the finished product. Knowing that there are many men in the glass industry who have been handling fire clay refractories all their lives but who have never had an opportunity of visiting a refractory manufacturing plant, and who would no doubt profit by the knowledge of how clays are mined, molded into shape and burnt, Laclede-Christy announce that arrangements have been made by which the film is available for showing, free of charge. A booklet describing the film has been issued by the company, and copies are available for distribution to any audience which may gather to view the film.

Brown Pyrometers—Catalog No. 14, The Brown Instrument Company, Philadelphia, Pa. 64 pages, 8 x 10½ inches. A comprehensive catalog of the company's products, emphasizing particularly improvements made in temperature measuring instruments and methods during the past five years. The applications of pyrometers to various industries are described. Advice is given on how to choose the proper pyrometer equipment, and many of the Brown temperature indicating, recording and controlling instruments and accessories are cataloged and described. Brown radiation and other types of pyrometers are included. Wiring diagrams are given. In order to show the company's facilities for "building accuracy, simplicity and ruggedness" into Brown pyrometers, descriptions and illustrations are given of the various departments of company's plant, including research and engineering departments, model shop, tool room, assembly shop, laboratory and inspection department, shipping department, field testing and service departments and service stations.

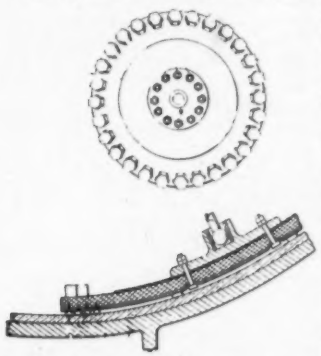
Recent Patents

NEW INVENTIONS DESIGNED TO IMPROVE GLASS AND THE MEANS OF PRODUCING IT

Copies of United States Patent Specifications may be obtained from the Commissioner of Patents, Washington, D. C. Price 10c each

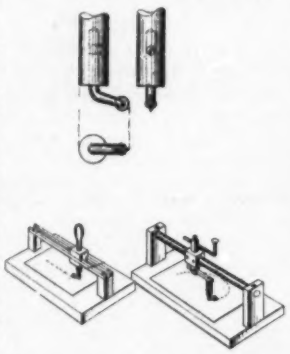
Runner for Grinding Curved-Glass Surfaces. U. S. 1,508,396. Sept. 16, 1924. Albert F. Johnston, of Ford City, Pa., assignor to Pittsburgh Plate Glass Company.

The invention relates to grinding runners designed for use in grinding, smoothing or polishing curved surfaces such as the inner and outer surfaces of glass blanks for use as parabolic mirrors. The runner comprises a disc of felt or other flexible material which is unsupported except in its central portion where the spindle is attached, the intent being to leave the outer portion of the felt sheet free so that it can adapt itself to the contour of the surface being ground. The front face of the sheet or disc is provided with metal grinding members, preferably in the form of screws or nails having their shanks embedded in the felt and having their heads exposed so as to act as grinding elements. When the runner is used for polishing, the metal grinding elements are, of course, omitted.



Glass-Cutting Mechanism. U. S. 1,511,016. Oct. 7, 1924. A. Prescott Barker, of Lynn, Mass.

A glass cutter comprising a handle, a cutting wheel, a carriage presenting angularly disposed portions for engagement with the said handle and the said cutting wheel respectively, the said handle-engaging portion being enclosed for almost its entire extent within a socket in the said handle and the said wheel-engaging portion being adapted to trail the said handle, and releasable means locking the said handle-engaging portion of the said carriage within the socket of the said handle and permitting the said carriage to turn with respect to the said handle for rendering the said cutting wheel self-adjusting.



Apparatus and Method for Transferring Glass Cylinders. U. S. 1,509,687. Sept. 23, 1924. John Murphy, of Hartford City, Ind., assignor to Window Glass Machine Company, of Pittsburgh, Pa.

Among the inventor's claims is the method of transferring severed cylindrical glass sections from a capping horse to a splitting station, which includes moving a transfer device into lifting position with a section lying on the horse, causing relative movement between the horse and the transfer device and thereby lifting the section from the horse, moving the transfer device together with the section supported thereby to the splitting station, and turning the cylinder out of line during such movement, the section during such lifting and such turning and transferring movement to the splitting station being supported entirely by the transfer device and out of supporting contact with the operator, thereby avoiding stains and stresses, substantially as described.

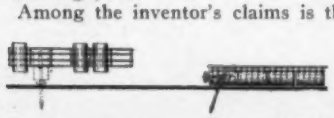
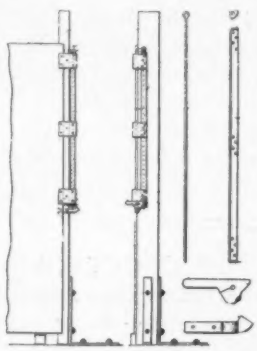


Plate-Glass Inspection Clamp. U. S. 1,508,468. Sept. 16, 1924. George W. Oakes, of Crystal City, Mo., assignor to Pittsburgh Plate Glass Company.

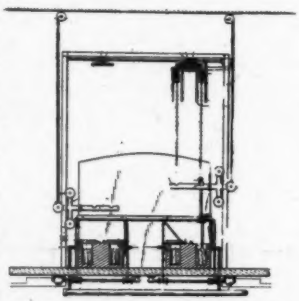
The invention is designed to provide a simple means which is easily operated for holding the sheets securely in upright position during the process of examination.



The inventor claims in combination in a glass supporting device, a vertical post adapted to engage a sheet of glass to be examined along one of its vertical edges, a clamping frame hinged to the post and adapted to swing to holding position over said edge, a catch member secured to the post beneath the frame having an inclined locking surface, and a latch pivoted to the lower end of the frame for movement transversely of the catch and adapted to engage said locking surface, so that the frame is cammed inward against the glass when the latch is swung to locking position.

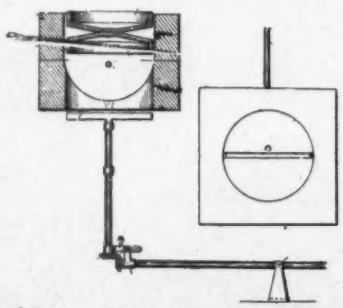
Glass-Drawing Apparatus. U. S. 1,509,183. Sept. 23, 1924. David L. Swindell, of Okmulgee, Okla.

The general object of this invention is to provide means for forming sheet glass by means of a vertically movable bait of elongated form, to provide means for conveying the sheet of glass after being drawn to a pivoted supporting member which can be swung into horizontal position to place the sheet of glass upon other conveying means which will take the sheet to a point where it can receive further treatment. A further object is to provide a number of retorts having openings therein through which the bait passes and doors for closing such openings with means whereby when one door is open to permit the bait to enter, the other doors are closed so that the molten mixture in said closed retorts will be heated to the proper temperature for drawing while the glass is being drawn from the open retort.



Cleaner for Glass Pots. U. S. 1,511,550. Oct. 14, 1924. William Westbury, Independence, Kans., assignor to Laura Anna Westbury.

This invention relates to cleaners for glass pots and particularly to pots of that class designed to hold a charge of molten glass from which glass in suitable form for the production of window glass is to be drawn.

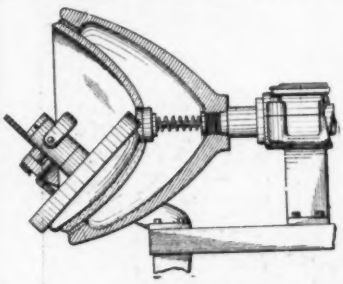


The inventor claims in a cleaner for glass pots, the combination of a melting kiln or furnace having a melting chamber in the top thereof and drain outlets and a guide slot in the bottom thereof, a reversible pot movable vertically into and out of said chamber,

a scraper movable vertically through the slot into and out of contact with a surface of the inverted pot, a tilting element for raising and lowering said scraper, and means for rotating the scraper for a cleaning action.

Glass-Polishing Machine and Holding Chuck. U. S. 1,511,828. Oct. 14, 1924. Charles W. Dake, of Chicago, Ill., assignor to the Pyle-National Company of Chicago, Ill.

This invention relates to a polishing machine for polishing glass headlight reflector bowls and the like and is especially concerned with the chuck adapted to hold the bowl on the spindle and with the polishing pad used to perform the polishing act.



The inventor claims in a chuck for headlight reflector bowls comprising a cup adapted to enclose the bowl, a packing ring interposed between the mouth of the cup and the body of the bowl, a spring-held valve adapted to yieldingly engage the bowl and close an opening there through, a spring therefor, a fluid conductor adapted to be connected to an exhausting means, and having a fluid passage connecting with the cup, the tension on the valve holding spring being sufficient to prevent opening of the valve by atmospheric pressure while permitting expansion and contraction of the bowl without unseating the valve.

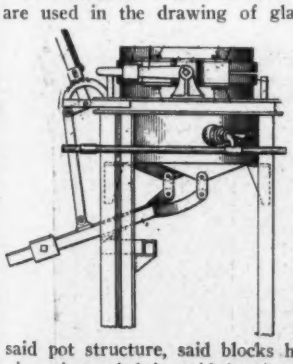
Nonglare Structure. U. E. 1,509,481. Sept. 23, 1924. Edward I. Petow, of Hyannis, Mass., assignor of one-half to New England Glass Works, of Providence, R. I., a partnership composed of Albert Weiner, Isaac L. Rice and Alexander Weiner.

A nonglare structure suitable for headlight lenses comprising a sheet of transparent material and a film associated therewith and made from a compound consisting of a mixture of 10 cu. cm. of essence d'orient and 12 fluid oz. of a vehicle such as cotton lacquer.

The inventor claims that the substance known usually as essence d'orient or oriental pearl essence when applied to a transparent support such as a sheet of glass or sheet of celluloid will cause intense and glaring rays of light when transmitted through such treated sheet to lose the intense glare without diminishing the volume of light.

Reversible Pot. U. S. 1,511,551. Oct. 14, 1924. William Westbury, of Independence, Kans., assignor to Laura Anna Westbury.

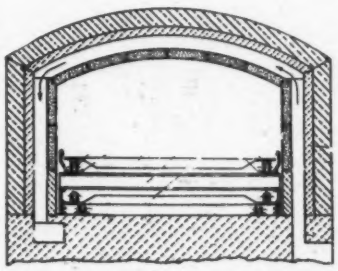
This invention relates to reversible glass drawing pots, such as are used in the drawing of glass cylinders, and has particular reference to the construction of a pair of opposed pot members and means for holding the same assembled and in working relation and for pivotally mounting said pot members as a unit in their bearing supports.



The invention claims in a reversible pot, the combination of a supporting frame having bearings, a pot structure comprising two pot members having their bottom walls arranged in apposition, segmental supporting blocks at opposite sides of said pot structure, said blocks having outwardly extending trunnions journaled in said bearings and having inwardly extending flanges projecting between the bottom walls of the pots, clamping members carried by the blocks and co-operating with the flanges for clamping the pot bottoms thereto, and adjusting screws on the frame engaging the ends of the trunnions.

Oven or Furnace. U. S. 1,502,070. July 22, 1924. Frank J. Tone, assigned to Carborundum Company, of Niagara Falls, N. Y.

This invention includes a muffle flue for furnaces, composed on three sides of clay tile and on the heat radiating side of silicon carbide. The invention has for its object to provide an oven wherein articles may be heated, heat treated, or annealed in an efficient manner. It particularly relates to the construction of glass lehrs of the muffle type and refers to the use in the wall construction of silicon carbide refractory materials as the conducting medium for transmitting the heat to the glass.



The inventor claims to have discovered that the use of silicon carbide tile in place of ordinary fire brick tile in the partition which transmits the heat from the combustion chamber to the muffle chamber results in effecting economies and improvements of the highest importance.

Glass. U. S. 1,508,455. Sept. 16, 1924. Charles A. Kraus, Worcester, Mass.

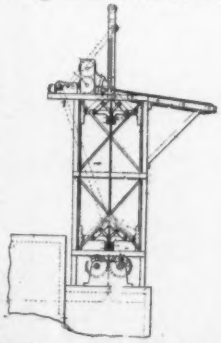
This invention relates to improvements in the composition of glasses and is addressed in particular to glasses having a low coefficient of expansion and having other properties which render them commercially useful.

In the following table the inventor gives the composition of various glasses which exemplify his invention, together with some of the more important properties of these glasses. Under the column headed a is given the measured linear coefficient of expansion multiplied by 10^6. Under the column headed H is given the relative hardness factor of the various glasses referred to pyrex glass containing substantially 70 per cent of silica, 20 per cent of boric oxide, 4 per cent of sodium oxide, and 6 per cent of alumina, as a standard for comparison. Under the column headed S is given the solubility of the glass in water.

No.	SiO_2	B_2O_3	Na_2O.	PbO.	K_2O.	$a \times 10^6$.	H.	S.
1.....	68	16.9	3.1	12	...	3.22	0.078	....
2.....	60	11.9	3.1	25	...	3.81	0.027	0.025
3.....	68	9.5	2.5	20	...	3.32	0.14	....
4.....	60	11.9	...	25	3.1	4.15	0.038	....
5.....	50	6.9	3.1	40	...	4.95	0.004	0.018
6.....	65	4.8	2.2	28	...	3.64	0.15	....

Apparatus for Drawing Sheet Glass. U. S. 1,508,049. Thomas B. Campbell, Jr., of Pittsburgh, Pa.

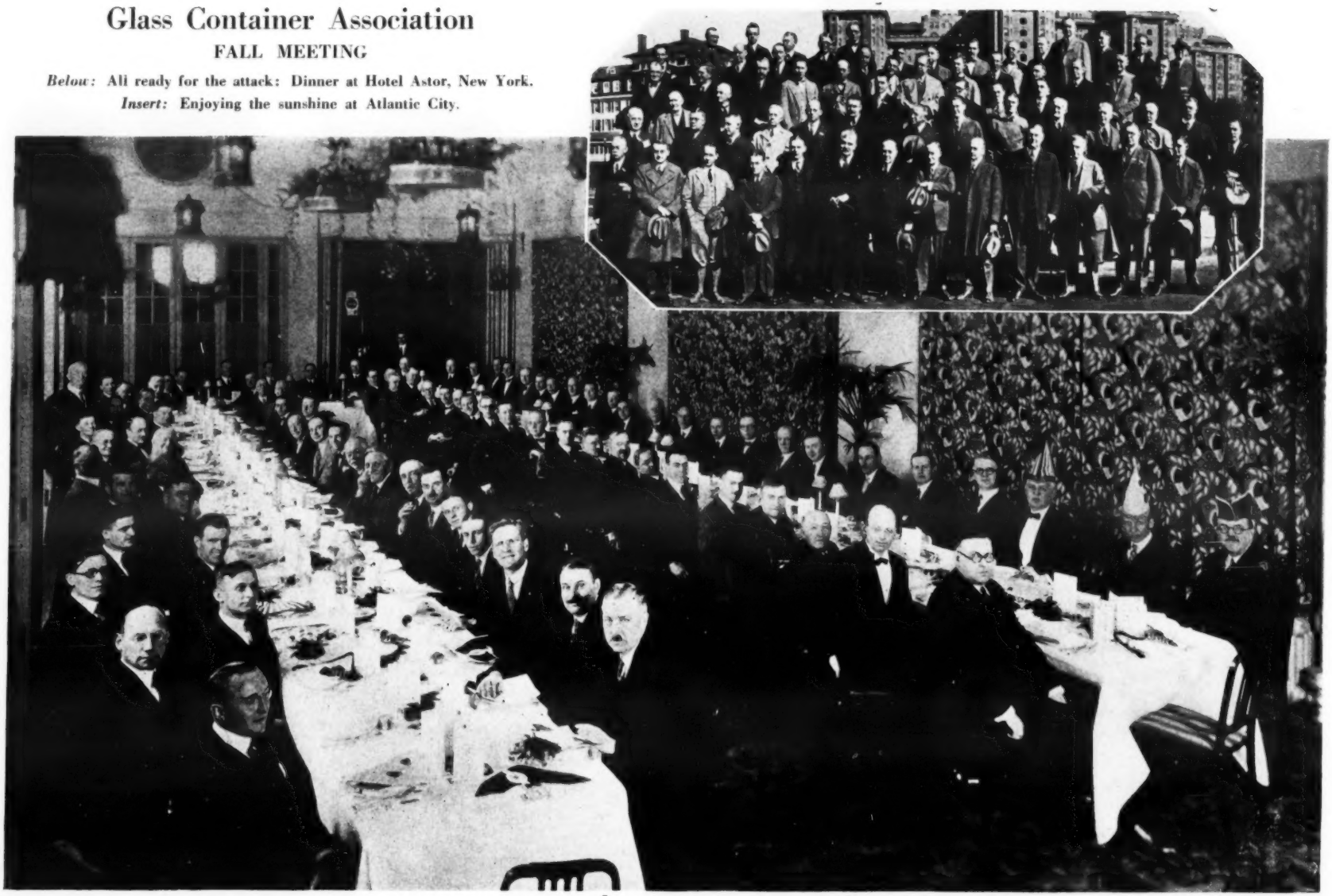
A sheet-glass drawing apparatus comprising a reservoir having an opening at its top, a supporting framework above the opening, air-cooled rollers adjacent said opening for gripping the edges of the drawn sheet, vertically reciprocating drawing frames mounted in the framework and breaking mechanism pivoted above the upper limit of travel of the drawing frames, the opening, gripping rolls, drawing frames and breaking mechanism -being in substantially vertical alignment, a conveyor belt mounted on the framework adjacent the breaking mechanism, the arms of which are adapted to rock so as to move below the upper surface of the belt, and means for periodically rocking the breaking mechanism to sever and deposit the formed plates on the belt.



Glass Container Association

FALL MEETING

Below: All ready for the attack: Dinner at Hotel Astor, New York.
Insert: Enjoying the sunshine at Atlantic City.



Fall Meeting of Glass Container Association

Unusually Interesting Meetings Were Well Attended

Several innovations were introduced into the program for the fall meeting of the Glass Container Association, a meeting which extended over three days, October 22, 23 and 24, covered two cities and proved very successful.

On the afternoon of Wednesday, the 22nd, a business session was held at the convention headquarters, Marlborough-Blenheim Hotel, Atlantic City, N. J., which was addressed by Frank Ferguson, president of the association, who spoke of its progress and accomplishments, its present efficient organization, its research, traffic and editorial, business and publicity departments, and its splendid new laboratory, one of the most completely equipped in the country. He stated that the association now has ninety-six members, and that there are at least one hundred other concerns which would be greatly benefited by joining, and he hoped it would not be long before the present membership was doubled. The larger and stronger the organization, the greater would be its power for good to the industry, not only in legislative matters but also in the research, traffic and other fields.

A. Cressy Morrison followed with a talk on "The Tariff," and from a deep knowledge of the subject and its practical effects on American industry warned his audience of the detrimental effect on business which would result from any tinkering with or lowering of the present duties. The hearty applause elicited by his remarks proved that the glass manufacturers were in close accord with his views. Mr. Morrison said that we in this country must not lose sight of the fact that intensely strong competition from Europe will have to be met here during the next few years. The value of the mark, for instance, for local transactions in Germany had not depreciated anything like as much as its foreign value, and employers of labor can get work done at a fraction of what it would cost in this country. He cited one case where a German manufacturer admitted that he had completely modernized his plant, paying for it in paper money at an actual cost of only ten per cent of its value under normal conditions. "Europe," said Mr. Morrison, "is stripped like an athlete for commercial conquest," and prepared for an invasion of the United States.

While this session was in progress, a card party, in charge of a committee consisting of Mrs. P. I. Heuisler, chairman; Mrs. J. D. Biggers, and Mrs. R. E. Walker, was held for the entertainment of the ladies attending the convention.

On Thursday morning another business session was held, and for the first time at a meeting of this kind a program of technical subjects was discussed. H. W. Seldon of Pittsburgh presented a paper on "Fuel Economy," describing the methods and equipment available for effecting savings of fuel and strongly emphasizing the necessity for scientific control of combustion throughout the industry.

H. L. Dixon, president of the H. L. Dixon Company, Pittsburgh, then addressed the gathering on "Modern Trend of Furnace Construction." He referred to the origin of the tank furnace and briefly followed its history down to the more efficient tank of today which in many factories delivers to the automatic machines an average of 60 to 70 tons of glass a day. The first Siemens tanks erected in England were failures, and that was the fate also of the first ones built in America. The earliest Siemens installation here was at Poughkeepsie, N. Y., and it and two others built at Jeannette, Pa., were total failures. The cause of the failure of the English installations was their shallowness. A depth of only three feet of glass was provided for, and this permitted so much heat to reach the bottom of the tank that the blocks soon failed.

A reaction from the shallow tank design followed, and furnace builders went to the opposite extreme, some tanks being designed to carry eight or ten feet of glass, but finally the most satisfactory depth was determined to be about five feet.

Mr. Dixon, referring to the tank block controversy, predicted the use of thinner blocks than those now used. He thought they would gradually be reduced to perhaps eight inches. He mentioned an opportunity that occurred recently for examining the inside of a tank from which the glass was all removed after only five or six weeks of operation. In that short period the block had been reduced in thickness to about five inches. This raises questions as to the wisdom of using thick blocks only to have them rapidly disintegrated and absorbed by the glass.

While discussing refractories, the speaker said he believed the time would come when tank blocks would be made by the continuous pug mill method. He also said he favored the use of small brick for checkers, on the ground that with their use a larger surface area is exposed to the heat. Other points brought out were that a uniform temperature in the tank tends to conserve the blocks, and that care should be taken to distribute the batch when fed into the tank, as large blocks of floating batch cast shadows on the bottom blocks and cause them to become unevenly heated in spots and set up irregular strains in the bottom of the tank.

Mr. Dixon said that many of the glass makers' troubles will disappear when melting can be done electrically. He believes that is surely coming and hopes to live to see the day. The stumbling block in the way at present is the lack of suitable refractories.

E. Ward Tillotson, of Mellon Institute, Pittsburgh, addressed the meeting on "Annealing." He demonstrated by means of partly dried cubes made of 20% gelatin and 80% water how the exposed corners and edges of articles which are being annealed (the case of glass being somewhat analogous to that of gelatin) are the first parts to become hardened and to form a sort of skeleton which supports the less exposed and more massive internal portions of the article, parts which cool at a necessarily slower rate, and how the unequal cooling of the different parts is the cause of internal strains. After continuing his talk for a short time the speaker suggested a general discussion of the subject and several members took part in it.

An extra number on the program was an address by Judge Wells, of Bordentown, N. J., on the "Philosophy of Life," a remarkable speaker who in expressing his conviction that the most important thing and the one thing most worth living for, is to follow the Golden Rule and be as helpful as possible to others, combined an inspirational talk with humor so successfully that he secured and held to the end the attention and interest of all present.

On Thursday afternoon the golf enthusiasts enjoyed themselves competing for prizes at the Linwood Country Club. Low gross went to F. S. Bicking; low net, W. H. Boshart; second low net, R. S. Owens; long drive, W. J. Snively; kicker handicap, A. F. Brady.

On Friday morning the party boarded the special cars provided for their use, and after luncheon on the train, upon arrival at New York, were taken to inspect the fine new research laboratory at association headquarters, 22 East 75th street. In the evening a theatre party was given for the ladies, and a banquet and most interesting entertainment was enjoyed by the members and their guests at the Hotel Astor.

The meetings in Atlantic City and New York were both well attended. About 90 members and guests as listed below went to the seashore resort and approximately the same number were present at the Friday night dinner in New York.

REGISTER OF MEMBERS AND GUESTS AT ATLANTIC CITY

J. P. Curren—American Bottle Co.
P. C. Doyle—American Metal Cap. Co.
Sterling Smith—American Metal Cap Co.
C. H. Werner—American Metal Cap Co.
J. R. Stewart—Anchor Cap & Closure Corp.
E. F. Glacken—Atlantic Bottle Co.
Geo. W. Yost—Bellaire Bottle Co.
H. P. Bridges—Berkeley Glass Sand Co.
N. E. Perin—Berkeley Glass Sand Co.
L. M. Buck—Buck Glass Co.
C. G. Hilgenberg—Carr-Lowrey Glass Co.
C. B. McComas—Carr-Lowrey Glass Co.
Wm. C. Hirsch—*The Ceramic Industry.*
T. Ryan, Jr.—Columbia Specialty Co.
A. J. Scopwich—Columbia Specialty Co.
F. L. Lloyd—Crown Cork & Seal Co.
L. S. Cunningham—D. O. Cunningham Glass Co.
W. G. Gundelfinger—Diamond Alkali Co.
M. L. Latshaw—Diamond Glass Co.
H. L. Dixon—H. L. Dixon Co.
T. W. Powell—Fairfield Paper Co.
John M. Gayner—Gayner Glass Works.

E. P. Lurch—Gem Stopper Co.
Judge I. G. Jennings—Glass Container Ass'n.
S. H. Ayers—Glass Container Association.
J. T. Hendricks—Glass Container Assn.
H. L. Hunter—Glass Container Association.
J. C. Magness—Glass Container Association
T. A. Wells—Glass Container Association.
V. L. Kirkland—*The Glass Worker.*
J. H. Graham—J. T. & A. Hamilton Co.
T. F. Hart—Hart Glass Mfg. Co.
F. H. May—Hart Glass Mfg. Co.
G. W. Cooper—THE GLASS INDUSTRY.
Roger M. Eldred—Hartford-Empire Co.
E. O. Hiller—Hartford-Empire Co.
J. S. Algeo—Hazel-Atlas Glass Co.
A. F. Brady—Hazel-Atlas Glass Co.
H. S. Brady—Hazel-Atlas Glass Co.
W. H. McClure—Hazel-Atlas Glass Co.
A. B. Paxton—Hazel-Atlas Glass Co.
Frank Ferguson—Illinois Glass Co.
C. P. Levis—Illinois Glass Co.
G. M. Levis—Illinois Glass Co.
O. S. Thompson—Illinois Glass Co.
W. S. Hood—Kimble Glass Co.
E. E. Kimble—Kimble Glass Co.
G. F. Collins—Liberty Glass Co.
P. I. Heuisler—Maryland Glass Corporation.
A. W. Crownover—Maryland Glass Corp.
J. W. Boyer—Mathieson Alkali Works.
W. D. Marshall—Mathieson Alkali Works.
D. M. Hunger—McKenna Brass & Mfg. Co.
G. M. Dunning—Michigan Alkali Co.
B. P. Steele—Michigan Alkali Co.
J. P. Brunt—Mid West Box Co.
R. T. Cunningham—Monongah Glass Co.
T. L. Briggs—National Seal Co.
R. Owens—National Seal Co.
R. A. Russell—Paragon Can & Cap Co.
H. L. Lonsdale—Phoenix Hermetic Co.
C. P. Overmeyer—Overmeyer Mould Co.
J. S. Biggers—Owens Bottle Co.
W. H. Boshart—Owens Bottle Co.
A. F. Reed—F. E. Reed Glass Co.
F. E. Reed—F. E. Reed Glass Co.
C. J. Root—Root Glass Co.
W. R. Root—Root Glass Co.
R. R. Shively—B. F. Drakenfeld & Co.
E. Ward Tillotson—Mellon Institute.
H. W. Seldon—H. W. Seldon & Associates.
J. D. Dilworth—Salem Glass Works.
E. F. Brundage—Solvay Process Co.
H. F. Merritt—Solvay Process Co.
W. B. Swindell, Jr.—Swindell Bros.
F. E. Baldwin—Thatcher Mfg. Co.
A. E. Williams—Thatcher Mfg. Co.
R. E. Walker—Turner Bros. Co.
S. A. Waller—Tygart Valley Glass Co.
G. S. Bacon—Whitall-Tatum Co.
Mr. Maule—Whitall-Tatum Co.
E. S. Thorpe—Whitall-Tatum Co.
W. J. Snively—Williams Sealing Corp.
A. L. Williams—Williams Sealing Corp.
S. T. Shoneman—Isaac Winkler & Bro. Co.
P. K. Winslow—Winslow Glass Co.
T. S. Goslin—R. D. Wood & Co.
G. C. Heilmann—R. D. Wood & Co.
R. W. Whitney—Hinde & Dauch Paper Co.
Robert Newbold—General Felt Products Co.

The Glass World and What It Is Doing

News of the Industry

American Window Glass Annual Report

At the annual meeting of the stockholders of the American Window Glass Company held at Pittsburgh, October 21, a report for the fiscal year ending August 29, 1924, was presented. The profit and loss account follows:

For period ended August 29, 1924.

Net profit from operations		$ 1,951,291.22
Other income		544,589.38
Total income		$ 2,495,880.60
Deductions from income—		
Reserved for taxes	$ 141,336.35	
Royalty	1,419,898.28	
Other charges	42,522.51	
		1,603,757.14
Surplus for year		$ 892,123.46
Surplus, August 31, 1923		10,383,849.70
Total surplus		$11,275,973.16
Deductions from surplus—		
Dividends on capital stock	$ 279,650.00	
Charges applicable to prior year's operation	68,845.00	
		348,495.00
Surplus, August 29, 1924		$10,927,478.16

The officers and directors of the company were re-elected for the ensuing year.

President Munro reported that while the total production for the year showed a loss from the previous year, yet the average production per machine per shift surpassed all previous records. The quality of the glass also was most satisfactory. These results were made possible by the operation of the company's large furnaces, the smaller and less efficient ones being shut down. The large furnaces again demonstrated their economy and efficiency; they were operated for a longer period without shutting down for cold repairs than any other glass furnaces were ever operated. Upkeep expense consequently was much less in proportion to output than with other furnaces.

Company Experimenting with Fourcault System

In the course of his report Mr. Munro referred to recent changes in methods of window glass manufacture as follows:

"The success that we have attained with our process has gradually forced competitors to seek different methods of producing window glass in order to compete with us. To such an extent has this affected the hand blowing process that there are now only a very small number of factories attempting to operate by that method, and those factories for the most part are either co-operative or located in districts where they are able to secure natural gas at a very low price. Quite a number of factories are operating and using many of our expired patents, and infringing some of our unexpired patents. A number of other factories have installed various forms of 'flat-drawn sheet processes,' among which is the Fourcault process. This process has been in operation commercially in Europe for over fifteen years, and within the last few years more satisfactory results have been secured with it than heretofore. Installations of this process have been made in England, Belgium, Holland, France, Germany, Italy, Czecho-Slovakia and China. During the past year five factories in this country have been equipped with this process and placed in operation, while others are under construction.

"A careful study of the operations of this process has been made on behalf of the company in various European countries. As a result of this study at various operating factories, together with accurate reports of the results obtained in other installations, we feel justified in stating that up to the present time the glass produced by this process is not of sufficient quality to supply the average requirements of the trade in this country. With this process a very large percentage of the product is glass of inferior quality, for which there is only a limited market in this country and at prices far below those obtained for glass of standard qualities and grading. With the knowledge that we have of the results obtained by all the various methods of making window glass, there is no doubt that so far as the quality of the product is concerned, there is no process of manufacturing window glass in use today in any part of the world that produces as large a percentage of glass of good quality as our process. There is undoubtedly a considerable saving in labor in the flat-drawn processes in comparison with ours; but, on the other hand, the average fuel consumption per box of glass produced by any of these other processes, up to the present time, is considerably greater than the average fuel consumption per box produced under our process.

"From our study of the Fourcault process we are of the opinion that it has possibilities of improvements, which make it highly desirable for us to experiment with it. This we have decided to do.

"The introduction of the flat-drawn sheet processes has created a demand from a portion of the trade for glass that is 'flat,' as distinguished from the glass that is slightly bowed when flattened by the old time process. In order to meet this requirement of a part of the trade we made a careful study of our flattening process and have succeeded in perfecting a

new process of flattening and annealing, whereby we are able to turn out glass as flat as that produced by the sheet-drawn processes. We are now producing this flat glass regularly at all of our factories, in order to place our product on the same footing as the sheet-drawn glass; although we realize, and so advise the trade, that the so-called 'flat' glass, no matter by what process it is made, as shown by government tests, is not as strong as the bowed glass; and that a building glazed with bowed glass presents a much better appearance than if glazed with 'flat' glass."

President Munro described market conditions during the fiscal year. He stated that the stocks of window glass in the distributors' hands are lower than ever before. He also referred to the need of protective tariff rates and pointed out that 605,229 50-foot boxes of window glass were imported into this country during the year ending June, 1924. On account of the low prices made by European makers of dry plate coupled with the insufficient protection given under the present tariff law on that kind of glass, the company was obliged to shut down its Monongahela factory where dry plate is produced.

During the year a number of suits on infringements of patents owned by the company were entered against several concerns.

Glass Company Sued

A suit has been filed in the United States District Court, Philadelphia, Pa., by Elias Buegeleisen of New York, against the Super-Glass Company of Philadelphia, to recover $745,980 which the plaintiff asserts would have been the profits of the firm of Strauss & Buegeleisen, of which he is now the sole member, from contracts with various Governmental departments for glass lenses for gas masks, aviators' goggles and other headgear, had not the Super-Glass Company violated a contract it had with his firm and obtained contracts directly with the Government for the lenses.

Under five contracts with the Government in the early days of the war, the defendant company, it is asserted, furnished nearly 11,000,000 lenses. It had previously agreed that it would furnish its entire supply of lenses to his firm, Buegeleisen asserts, but, after he had made several contracts with the Government to supply lenses for use in the war, the defendant company said it would not continue manufacturing lenses and goggles unless the Government's rigid inspection was modified.

The plaintiff says he secured a cancellation of the contracts and started negotiations for new contracts. While he was doing this, he avers, the glass company made five contracts with the Government and he was shut out.

Cheap Gas at Corpus Christi, Texas

The discovery at Corpus Christi, Tex., of an extensive natural gas field simultaneously with the approval of the federal government for a deep water harbor at that point, has led to a considerable agitation there for industries. Among these, there has been much interest in the manufacture of glass. It is pointed out at Corpus Christi that large deposits of sand exist there suitable for the manufacture of a good grade of glass. Part of this sand is located on or near railroads and close to the turning basin of the new port; part of it is a few miles out of town. Analysis, it is said, has shown this sand to be adaptable for making a good grade of glass.

The organization behind the government says that the rapid agricultural and industrial development of the area contiguous to Corpus Christi indicates that the development of the glass industry at that point would be profitable. Corpus Christi serves a large territory north and south along both the Gulf Coast Lines and the San Antonio and Arkansas Pass Railroad. The Corpus Christi area embraces nearly 2,000,000 acres of rich black land. At present, only about 20 per cent of this land is in cultivation. It is rapidly going under the plow, however, with the result that the many small towns within a radius of sixty miles of Corpus Christi are all growing rapidly and increasing their demands for glass.

Glass for this section is now supplied largely from North Texas and Oklahoma. Only one small glass factory—a bottle works—exists between Corpus Christi and North Texas. A glass plant at Corpus Christi would have the advantage of those plants in its own market and would be able to compete with them over a considerable area.

Natural gas is offered to such industries by the city of Corpus Christi at the ridiculously low figure of five to ten cents a thousand, depending on the amount used. Deep water transportation not only places Corpus Christi in line to enter the Mexican and South American trade, but secures to all industries located there the advantage of tidewater freight rates.

Decision in Bulb Machine Patent Case

The cases of Chamberlin vs. Kadow and Kadow vs. Chamberlin, in which priority of invention was awarded to Chamberlin as to certain counts, while other counts were awarded Kadow, came up recently before the Court of Appeals of the District of Columbia.

Claims 50, 51, 57, 61 and 62 call for a "variation in the angular movement of the gatherer," or means for "temporarily retarding the motion of the gatherer." As to these claims, the court agreed with the Patent Office that the limitation is not sufficiently specific to prevent Chamberlin from making them.

Kadow withdraws his appeal as to claims 1, 2, 13, 15, 16, 24, 26, 29, 45 and 53. Claims 7, 8, 9, 10, 11, 27, 28, 48, 49 and 52, or the so-called swinging counts, are directed to the feature of oscillating the spindle to elongate the blank. The difference in dates awarded the two parties by the lower tribunals of the Patent Office was very slight. The Assistant Commissioner found that the date accorded Kadow as to these particular claims was earlier than any date to which Chamberlin was entitled, and the court agreed with that finding for the reasons he has stated. Decision was reversed as to claims 31 to 41 inclusive, 43, 58, 59 and 60, but affirmed as to all the other claims. Further particulars may be found in the Official Patent Gazette, issue of October 7, 1924, copies of which may be obtained at 10 cents each from the Commissioner of Patents, Washington, D. C.

Reducing Building Costs

High construction costs are being attacked from a new quarter, according to Allen E. Beals of the Dow Service daily building reports. This time, instead of coming through the lowering of the wages of skilled artisans, or the shrinkage of market prices of basic building materials, the solution of the problem is through the heavier loading of structural steel.

Because of the improved quality of steel now being supplied to the building industry, the New York State Legislature has accepted a new limit for unit loading of steel, of 18,000 pounds per square inch, instead of 16,000 pounds, the maximum permitted in the city of New York. This extension of the load limit is now standard not only in Buffalo and Syracuse, but also in numerous other cities throughout the country. In many cities the change in requirements has been based on the findings of the American Institute of Steel Construction or some other recognized authority. Investors have been told that the adjustment of the steel unit loading limit would result in the caving in actual weight and expense of about 12 per cent.

Mirror Manufacturers Establish Fellowship

The Mirror Manufacturers' Association held its fall meeting at the William Penn Hotel, Pittsburgh, on October 8 and 9, under the chairmanship of John Kinsella, of Chicago, and with Harry C. Sorden as secretary. The association has decided to establish a fellowship at the Mellon Institute, Pittsburgh, to begin an once and to be devoted to research work with the object of developing better silvering and backing methods.

Further Discussion of Tank Insulation

The Pittsburgh Section of the American Ceramic Society met on October 20 at the Mellon Institute with J. W. Cruikshank, chairman of the section, presiding, and heard an interesting paper by W. K. Brownlee, of the Buckeye Clay Pot Company, Toledo, O., on the "Effect of Insulation on Flux Line Blocks in Glass Melting Furnaces," and another by Walter Kennedy, of Celite Products Company, of "Kiln Insulation."

Mechanical Engineers Annual Meeting

The American Society of Mechanical Engineers will hold its forty-fifth annual meeting in the Engineering Societies Building, New York, December 1 to 4, inclusive, coincident with the third National Exposition of Power and Mechanical Engineering which will be held at the Grand Central Palace, New York, December 1 to 6. At the Engineers' meeting a session on oil burning and one on the handling and storage of oil will be held.

American Bottlers' Convention

The annual convention and exposition of the American Bottlers of Carbonated Beverages will be held at the Jefferson County Armory, Louisville, Ky., November 10 to 14. Many of the bottle manufacturers are interested in this convention and quite a number of them as listed in a previous issue will exhibit their products. An elaborate program, including instructive addresses on certain bottling problems, and entertainment in various forms has been provided.

Trade Activities

It is reported that the **Sterling Glass Company,** Lapel, Ind., is building a new tank 50% larger than the one being replaced.

Fire at the plant of the **Bonita Art Glass Company,** Wheeling, W. Va., on October 10, caused heavy damage, variously estimated at $75,000 to $100,000.

The Pierce Glass Company, Port Allegany, Pa., resumed operations about the middle of October, after an extended shutdown for improvements and repairs.

The Western Plate Glass Company, St. Louis, Mo., has been incorporated by Joseph Dickson, Jr., vice-president, and Fred L. Davis, 5149 Westminster street, secretary.

The Wellston Paint & Glass Company, 5990 Easton Ave., St. Louis, Mo., has been incorporated with a capital of $20,000 by William B. Madden, William Riley and others.

The Mississippi Glass Company, 4070 No. Main St., St. Louis, Mo., is having plans prepared for a 1-story, 60 x 342 ft. building of reinforced concrete, brick and steel construction.

The Beekman Plate Glass Company, New York, has been incorporated with a capital of $6,000, by L. Morrison, L. Dorken and A. C. Smith. A. Rosenstein, 320 Broadway, New York, is attorney for the company.

The Tulsa Plate Glass Company, Tulsa, Okla., has been incorporated by Sybil Cavanaugh, J. R. Cavanaugh, Mrs. C. J. Hoffman and C. W. Hoffman, all of Tulsa. Capital stock is reported to be $20,000.

R. P. Cargille has resigned his position as salesman for the Emil Greiner Company, New York, and has established a selling agency at 74 Cortlandt street, New York, where he will specialize in new products and appliances for the laboratory.

S. B. Bowman, recently appointed district manager of the Hazel-Atlas Glass Company for the states of Ohio and Oklahoma and until recently located at the company's main office at Wheeling, W. Va., is now making his headquarters at the Zanesville, O., plant.

Onondaga Mirror and Glass Works, Syracuse, N. Y., has been incorporated with a capital of $20,000 preferred stock, 400 shares of common stock no par value, by C. W. Stone, J. S. Kingston and A. I. Tupper. F. E. Hudson, Syracuse, is attorney.

The board of directors of **The Libbey-Owens Sheet Glass Company,** Toledo, O., on October 18, declared an extra cash dividend of 50 cents per share on common stock payable November 1, 1924, to stockholders of record at the close of business, October 22, 1924.

A dispatch from Fort Smith, Ark., states that the transportation cost on a carload of mirror glass which recently reached that city from Ottawa, Ill., amounted to $2,000. It was shipped by express in order to meet a threatened shortage of working material at the **Porter Mirror and Glass Company.**

Arnold Fiedler, until recently connected with the Spencer Lens Company, Hamburg, N. Y., has taken charge of the plant of the Peltier Glass Company, Ottawa, Ill., where his knowledge of colored glasses will have a wide range of application as the company intends to extend its activities in this line.

At an invitation conference on employee representation to be held by the American Management Association, at the Hotel Winton, Cleveland, O., November 13 and 14, **Dr. C. A. Eaton,** manager of the Industrial Relations Department of the National Lamp Works, Nela Park, Cleveland, will be one of the speakers.

C. J. Nolan, formerly with the Libbey Glass Manufacturing Company, Toledo, O., has been made general manager of the Inland Glass Company, Chicago, Ill. E. W. Fogel, who has been superintendent since the Inland plant was placed in operation, has resigned, as have a number of other members of the old staff.

The Pacific Window Glass Company, Los Angeles Cal., has purchased the window glass plant of the Patterson Glass Company, at Stockton, Cal. The officers of the new company are: E. P. Jones, president; S. E. Pierce, treasurer and Charles Martin, works manager. The plant will open about the middle of November.

Announcement has been made that the **Thatcher Manufacturing Company** are increasing the capacity of their Streator, Ill., plant by replacing an old 30-ton tank with a 75-ton tank, new gas producers, annealing lehr, new batch and coal handling and storage equipment and other appurtenances, involving an expenditure estimated at $250,000 to $300,000. The work, which is in charge of C. F. Ryan, formerly with the Russell Engineering Company, will probably be completed about two months from now.

The Dura Glass Manufacturing Company, Morgantown, W. Va., which was an outgrowth of the Athens Glass Company, is in the hands of W. R. Chapman as receiver. **The Dura Glass Corporation,** with main offices at 160 Fifth avenue, New York, calls attention to the fact that their company is not involved in the receivership and that it is in full operation as usual.

The Elk Run Window Glass Manufacturing Company, Punxsutawney, Pa., has been granted a Pennsylvania charter of incorporation and is capitalized at $25,000. The incorporators are: M. S. Reams, Abe Kesler, and J. H. Fink. The company commenced operations at its plant on October 6, with 120 employees and it is reported that the entire output of the plant has been sold for the next eight months.

The Wightman Bottle & Glass Manufacturing Company, Parkers Landing, Pa., has resumed operations after a suspension of six weeks. The company is at present operating one machine and six hand shops but expects to place another machine in operation as soon as it is installed. During the shut down an addition to the wareroom was made and a second air compressor and new engine were installed.

The Armstrong Cork & Insulation Company, Pittsburgh, Pa., announce that their Cleveland office is now located at 2207-2221 East 14th street. Their Houston, Tex., office is now located at 903 Keystone Building. New warehouse facilities have been established at Houston and the company's products are now carried in stock. The New Orleans office, H. T. Steffee, Agent, has been moved to 929-930 Tchoupitoulas street.

Cold repairs, which were in progress at the plant of the **Continental Flat Glass Company,** Shreveport, La., during September are completed. Fires were lighted October 7, and the plant is about ready to resume operations. Some of the problems related to Fourcault operation have already been solved and the management looks forward with confidence to supplying the trade with glass of good color and unusually soft cutting quality.

The Capstan Glass Company, manufacturers of jars and tumblers, Connellsville, Pa., have awarded the Austin Company, engineers and builders, Cleveland, O., a contract for the construction of two units at its main plant. The new units, of one and two-story design, will house furnaces, lehrs, machine shop, and packing and shipping departments. The construction will involve approximately 100,000 square feet

of floor space and will require over 400 tons of structural steel.

The meeting of the **Atlantic States Shippers' Advisory Board,** held at New York, September 11, was attended by the traffic representatives of a number of glass factories, including: J. B. Hayes, Illinois Glass Company, Alton, Ill.; H. W. Stebbins, Thatcher Manufacturing Company, Elmira, N. Y.; W. W. Stephens, Westinghouse Lamp Company, Bloomfield, N. J.; E. S. Thorpe, Whitall-Tatum Company, Millville, N. J., and C. L. Ware, Owens Bottle Company, Glassboro, N. J., and also J. T. Hendricks, director of traffic, and J. C. Magness, of the Glass Container Association, New York.

The Austin Company, Cleveland, O., reports that it has obtained through its Pittsburgh office a contract from the **Findlay Clay Pot Company,** Washington, Pa., manufacturers of clay pots for glass plants, for a new manufacturing unit, 160 x 160 feet, triangular in shape, part of which is one story and part four story in design. The Austin Company has guaranteed completion of the work in 120 working days. In addition to 35,000 square feet of floor space, the contract also calls for the design and construction of seven large concrete silos. Approximately 100 tons of structural steel will be required for the buildings. Construction and all purchases will be handled by the main office of the builders in Cleveland.

Last March, **Henry L. Doherty & Company** announced the acquisition through **Combustion Utilities Corporation,** of the **Surface Combustion Company, Inc.,** industrial furnace engineers and manufacturers. The Combustion Utilities Corporation has just announced the consolidation of the personnel and activities of its appliance and industrial furnace departments with those of the Surface Combustion Company, Inc. The greater organization continuing under the name of the Surface Combustion Company, Inc., will be the utilization division of Combustion Utilities Corporation. The Surface Combustion Company, Inc., sales and general offices will be continued at 366-368 Gerard avenue, New York, and all production at the Toledo Works, 2288 Albion street, Toledo, Ohio.

John Schies

John Schies, age 69, at one time head of the Pennsylvania Glass Company, a large industry established at Anderson, Ind., during the gas boom days, died at his home in that city on September 26. He went to Anderson from Meadville, Pa., in 1889 and started the Pennsylvania company of which he was secretary and treasurer and in active charge for several years, eventually becoming president. The glass factory was moved to Dunbar, W. Va., a few years ago at which time Mr. Schies retired.

Coming Meetings

The **Exposition of Inventions** will be held in the Engineering Societies Building, New York City, December 8 to 13.

The annual meeting of the **National Glass Distributors' Association** will be held in Pittsburgh, Pa., during December, 1924.

The **American Ceramic Society** annual meeting will be held at Columbus, O., February 16 to 21, inclusive, 1925.

National Ornamental Glass Manufacturers' Association will hold its next annual convention in Pittsburgh, June 24 to 26, 1925.

The **Third National Exposition of Power and Mechanical Engineering** will be held at the Grand Central Palace, New York, December 1 to 6, 1924. The exposition will as usual parallel the meeting of the **American Society of Mechanical Engineers,** which will be held in the Engineering Societies building, 29 West 39th street, New York.

National Glass Distributors' Association, annual meeting, Pittsburgh, December 9 and 10.

Inquiries Received

For Further Information Address THE GLASS INDUSTRY.

227. (From India). I would like to get in touch with builders of furnaces and producers for wood and coal fuel, also manufacturers of machinery for crushing, washing, drying and screening sand and for automatically weighing and mixing batches. Also the manufacturer of the Westlake automatic bulb blowing machine.

228. Kindly give me the names of manufacturers of blank glass paper weights and unmounted thermometer tubes. (Oct. 20.)

229. We would like to receive catalogs from manufacturers of equipment for making cut glass. (Oct. 8.)

230. We are interested in securing a baking oven for drying colors which have been sprayed on glass. (Oct. 11.)

231. (From England.) We would like the names of manufacturers of white opal and black polished plate glass of ¼" up to 1" thickness, suitable for covering walls, soda fountains and for similar purposes. We shall also be interested in plate glass in other fancy colors such as blue opal, violet opal, cream opal, etc. (Oct. 13.)

232. Please give me the address of firms in the United States who manufacture sheet quartz (used for hospital purposes). (Oct. 23.)

What the World Wants

Specific inquiries for American goods received in the Department of Commerce.

Numbers prefixed to the items refer to confidential information which may be obtained by concerns listed in the Exporters' Index by applying to the nearest district office of the Bureaus of Foreign and Domestic Commerce, or to headquarters at Washington, D. C. Mention the number of the inquiry in which you are interested.

To become listed on the Exporters' Index, it is necessary to fill out a form (Form 57), which may be had upon application to the Bureau or its district or co-operative offices.

New Zealand. 11793, machinery for making electric bulbs (vacuum pumps and special equipment).

Persia. 11907, glassware; 11915, glassware.

India. *11954, glassware; 11956, glass bottles and jars.

Australia. *11999, scientific instruments and laboratory apparatus, porcelain and glassware.

Stock Quotations

(Reported by Moore, Leonard & Lynch, Union Trust Building, Pittsburgh, Penna.)

PITTSBURGH STOCK EXCHANGE, OCTOBER 23, 1924

	Bid	*Ask*	*Last*
American Window Glass Machine, common..	85	86	85
American Window Glass Machine, preferred	92	93	94
American Window Glass, preferred.....	..	110	110
Pittsburgh Plate Glass.....	..	253	245
U. S. Glass.....	17¾	18	18
Standard Plate Glass, common.....	22	23	22⅝
Standard Plate Glass, preferred—			
Cumulative	87	..	87
Prior	98	..	99½

Glass stocks on the Pittsburgh Stock Exchange ruled lower with more supply than demand in the past month. Building glass demand continues to show a steady improvement. Buyers are asking for prompt shipments and in some cases factories are pressed to meet demands. Window glass shipments are in better volume than at any time in six months. Recent price cuts have had some effect in curtailing sales, but the continued building activity and the price guarantee to December 1st have caused distributors to buy more freely. Sales are however, far under the volume of several years ago. Contrary to the general assumption the acceleration in basic industrial production over the United States, is not proceeding at a slow lagging pace, but instead is advancing at a relatively rapid rate. The index level of industrial production is now 91, an advance of 9 points since mid-summer, when the level 82 approximated the lowest point in 1914. By the turn of the year, according to present indications, industrial production should be in normal volume. Returning confidence in the favorable outlook for business has served to stimulate contracting for immediate building requirements. Cold weather may delay this program somewhat, as there is in most sections no longer a heavy deficit of deferred building to be made up. Record breaking construction of the past three years has now brought the building industry to a point where further activity is to provide largely, only for current needs, without the added incentive of a shortage, to stimulate new building. Belgian competition has recently entered the American glass market.

WHEELING STOCK EXCHANGE, OCTOBER 23, 1924

	Bid	*Ask*	*Last*
Hazel-Atlas	27½	28	28
Imperial	75	88	88
Fostoria	140	150	140
Central	105	108	108

Glass plants have increased their activities to 80% of capacity in the Wheeling district the past month. Orders are in satisfactory volume.

TOLEDO STOCK EXCHANGE, OCTOBER 23, 1924

	Bid	*Ask*	*Last*
Owens Bottle Machine, common.....	41¼	41⅜	41½
Libbey-Owens Sheet Glass, common.....	102	105	104½

Current Prices of Glass-Making Materials

Quotations furnished by various producers, manufacturers and dealers.

October 23, 1924		Carlots	Less Carlots
Aluminum hydrate ($Al(OH)_3$)	lb.	.05	.05½
Aluminum oxide (Al_2O_3)	lb.	.06½	.07
Antimony oxide (Sb_2O_3)	lb.	.09½	.09¾
Arsenic trioxide (As_2O_3) (dense white), 99%	lb.	.06½	.07
Barium carbonate ($BaCO_3$) (precipitated)	ton	63.00	65.00
Barium hydrate ($Ba(OH)_2$)	lb.	.05	.05½
Bone ash	lb.	.06½	.07½
Borax ($Na_2B_4O_7 10H_2O$)	lb.	.05¼	.05½
Borax, fused ($Na_2B_4O_7$) any mesh	lb.	.19	.20
Boric acid (B_2O_3), fused	lb.	.35	.35
Cadmium Sulphide (CdS)—			
Red	lb.	..	1.60
Orange	lb.	1.50	1.65
Yellow	lb.	..	1.80
Chrome Oxide (Cr_2O_3)	lb.	.35	.38
Cobalt Oxide (C_2O_3)—			
In bbls.	lb.	..	2.10
In 10 lb. tins	lb.	..	2.20
Copper oxide—			
Red (Cu_2O)	lb.	..	.19
Black (CuO)	lb.	..	.25
Black prepared	lb.	..	.30
Cryolite (Na_3AlF_6)	lb.	..	.09⅛
Feldspar—			
100 mesh	ton	14.00	16.00
80 mesh	ton	12.00	..
40 mesh	ton	12.00	..
Ferrous oxide (FeO)	lb.	..	..
Fluorspar (CaF_2)—			
Powdered white, 95%	ton	38.00	..
Hydrofluoric acid (HF) 60% (in lead carboys)	lb.	..	.13
Kaolin (f.o.b. mine)	ton	9.00	12.00
Lead Oxide (Pb_3O_4) (red lead)	lb.	.11	.11
Litharge (PbO)	lb.	.10½	.10½
Lime—			
Hydrated ($Ca(OH)_2$) (in 50 lb. paper sacks)	ton	12.50	..
Burnt (CaO) ground, in bulk	ton	9.00	..
Burnt, ground, in paper sacks	ton	11.00	..
Burnt, ground, in 280 lb. bbls. per bbl.		2.15	2.30
Magnesium carbonate ($MgCO_3$)	lb.	..	.08
Manganese 85% (MnO_2)	lb.	.03¼	.03¾
Nickel oxide (Ni_2O_3), black, for nickel content	lb.	.30	.30
Nickel monoxide (NiO), green, for nickel content	lb.	.30	.30
Potassium carbonate—			
Calcined (K_2CO_3) 96%	lb.	.05½	.05¾
Hydrated (KOH) 85%	lb.	.05	.05¼
Potassium nitrate (KNO_3) (gran.)	lb.	.06	.06¼
Potassium permanganate ($KMnO_4$)	lb.	.12¼	.12½
Powdered blue	lb.	..	.24-26
Standard formula	lb.	..	.32
Salt cake, glassmakers (Na_2SO_4), f.o.b. works	ton	20.00-25.00	22.00-27.00
Selenium (Se)	lb.	..	2.10-2.25
Soda ash (Na_2CO_3) dense, 58%— f. o. b. works.			
Bulk, spot	Flat 100 lb.	1.35-140	..
Bulk, on contract	Flat 100 lb.	1.35	..
In 400 lb. bbls., on contract	100 lb.	1.69	2.40
In 400 lb. bags, on contract	100 lb.	1.45	2.16
Spot orders .05 per 100 lbs. higher.			
Sodium nitrate ($NaNO_3$), Refined (gran.) in bbls.	lb.	.04	.04½
95 per cent.		.02⅔	..
Sodium selenite (Na_2SeO_3)	lb.	..	2.00
Sodium Fluosilicate (Na_2SiF_6)	lb.	..	.07½
Sulphur (S)—			
Flowers, 155 lb. bbl.	Per 100 lb.	3.35	3.65-3.90
Flowers, in bags	Per 100 lb.	3.00	3.30-3.55
Flour, heavy, in bbls.	Per 100 lb.	2.50	2.85-3.05
Uranium oxide (UO_3), 100 lb. lots	lb.	..	1.25
Zinc oxide (ZnO)	lb.	.08	.08¼

Monthly Summary of United States Foreign Commerce in Glass

EXPORTS

Corrected to September 24, 1924

	August 1923 Quantity	August 1923 Value	August 1924 Quantity	August 1924 Value	Eight Months Ending August 1923 Quantity	Eight Months Ending August 1923 Value	Eight Months Ending August 1924 Quantity	Eight Months Ending August 1924 Value
Glass and glass products (total)	.....	$878,758	.....	$673,659	.....	$7,389,184	.....	$5,885,738
Plate and window glass—								
Window glass, common, box 50 sq. ft.	3,307	18,884	2,596	12,577	31,829	173,572	27,436	123,233
Plate glass, unsilvered, sq. ft.	66,843	44,012	110,049	31,386	1,524,391	634,979	1,325,099	382,305
Other windows and plate glass, n.e.s. lbs.	282,769	26,829	241,064	25,510	2,560,144	286,715	1,411,732	153,003
Glass containers (bottles, vials and jars) lbs.	6,294,286	308,770	6,211,155	255,069	50,405,684	2,417,340	41,170,184	1,953,888
Table glassware, plain lbs.	1,769,928	198,784	1,226,290	124,297	13,494,610	1,485,502	10,540,453	1,162,133
Table and other glassware, cut or engraved lbs.	21,239	10,040	34,179	11,039	354,269	138,328	319,913	96,687
Glass for lighting—								
Lamp chimneys and lantern globes lbs.	132,003	28,697	194,294	35,558	1,309,015	261,923	1,389,479	257,904
Globes and shades for lighting fixtures lbs.	164,748	42,990	93,156	30,603	988,052	300,421	833,709	257,555
Lamps and other illuminating devices, chiefly of glass lbs.	124,295	33,991	58,241	19,340	1,059,638	266,426	699,085	200,958
Chemical glassware lbs.	26,056	18,305	22,106	17,311	149,324	109,120	143,047	118,118
Electrical glassware, except for lighting lbs.	151,700	11,312	131,657	12,819	1,861,347	124,248	1,829,062	173,089
Other glassware, n.e.s. lbs.	672,651	136,144	383,984	98,151	6,839,444	1,190,610	6,143,626	1,006,865

IMPORTS

Corrected to September 24, 1924

Glass (total)	.....	2,863,774	.....	1,389,215	.....	16,004,277	.....	13,478,770
Cylinder, crown and sheet lbs.—								
Unpolished, lbs. dut.	5,796,014	227,564	3,676,370	188,642	35,443,333	1,546,404	23,143,310	1,329,316
Bent, ground, leveled, colored, painted, etc., and polished dut.	.....	75,809	.....	25,932	.....	559,871	.....	339,416
Plate glass—								
Unsilvered, sq. ft. dut.	3,247,040	2,000,018	1,006,240	547,071	17,253,891	10,115,494	12,359,253	7,663,684
Fluted, rolled, etc., or silvered, or containing wire netting, sq. ft. dut.	277,018	37,718	104,732	14,840	1,528,643	265,477	1,969,337	245,708
Containers—bottles, vials, etc. dut.	.....	20,545	.....	5,291	.....	158,548	.....	142,440
Table and kitchen utensils, lbs. dut.	47,275	13,402	81,988	16,996	257,945	84,838	585,890	121,180
Glassware, cut or decorated, lbs. dut.	415,581	167,006	359,842	163,376	2,205,240	861,115	2,301,717	1,096,166
Blown glassware, n. e. s., lbs. dut.	732,710	148,106	.....	.....	4,130,166	837,680	.....	.....
Bottles, ornaments, etc., lbs. dut.	.....	.....	575,152	181,394	.....	.....	3,161,951	1,016,142
Bulbs or electric lamps, number dut.	.....	.....	2,426,771	29,770	.....	.....	10,142,551	164,630
Chimneys, globes, shades, etc., lbs dut.	.....	.....	333,432	82,186	.....	.....	3,026,504	538,679
Articles and utensils for chemical, scientific, and experimental purposes, lbs. dut.	.....	.....	99,403	35,623	.....	.....	658,302	223,678
Other glassware free / dut.	.....	173,606	.....	98,094	.....	1,574,850	.....	597,731